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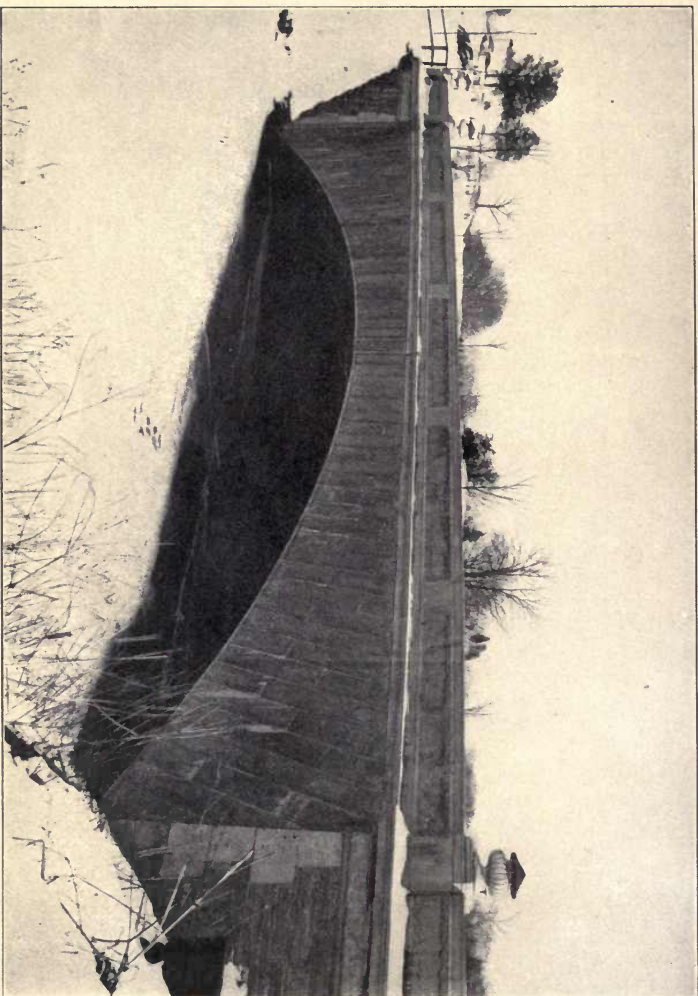
Annals N. Y. Acad. Sci., Vol. XVIII, Part I, January, 1908.











THE LINNAEUS BRIDGE, BRONX PARK, NEW YORK CITY.

Dedicated May 23, 1907.

Frank E. Peabody

(ANNALS N.Y. ACAD. SCI., Vol. XVIII, No. 1, Part I, pp. 1-90. January, 1908.)

THE BICENTENARY OF THE BIRTH OF  
CAROLUS LINNÆUS.

By EDMUND OTIS HOVEY, *ed.*  
*Recording Secretary.*

On May 23, 1907, the New York Academy of Sciences, in common with many other scientific societies and institutions throughout the world celebrated the two hundredth anniversary of the great Swedish naturalist Carl von Linné, who is better known perhaps by his Latin name Linnæus. In preparation for the event, the following invitation was sent out to sister societies throughout the world and to the Honorary Members of the Academy.

The New York Academy of Sciences  
will celebrate on May 23, 1907, the  
Two Hundredth Anniversary of the Birth of Carl von Linné.

At this time, commemorative exercises will be held at  
The American Museum of Natural History,      The New York Zoölogical Park,  
The New York Botanical Garden,      The New York Aquarium,  
The Brooklyn Institute of Arts and Sciences.

A beautiful bridge crossing the Bronx River between the Botanical Garden and the Zoölogical Park will be dedicated to the distinguished Swedish naturalist.

*(The Royal Swedish Academy of Sciences)*

is invited to take part in this celebration by contributing an official document, appreciative of the works of Linné, to be read before the members of the New York Academy of Sciences and assembled guests.

N. L. Britton,

President.

E. O. Hovey,

Secretary.

The invitation was accompanied by an illustration of the Linnæus Bridge, to which reference was made.

To all sister societies in the United States, Canada and Mexico, the following additional invitation was sent.

(*The National Academy of Sciences*)  
 is cordially invited by the  
 New York Academy of Sciences  
 to participate in its exercises  
 commemorative of the two hundredth anniversary  
 of the birth of the Swedish naturalist  
**Carl von Linné**  
 through an authorized representative  
 as well as by the official document asked for  
 in the accompanying invitation

An early reply is desired

On the day of the anniversary the committee charged by the Council with making arrangements for the celebration carried out the following program.

## PROGRAM OF EXERCISES

### MORNING

- 9:00-12:00.— At the American Museum of Natural History  
 Exhibition of American Animals known to Linnæus  
 In charge of F. M. CHAPMAN, W. M. WHEELER, W. BEUTENMUELLER  
 Exhibition of Shells, Minerals and Rocks known to Linnæus  
 In charge of L. P. GRATACAP, E. O. HOVEY  
 10:30.— Reading of letters from other Societies by the Secretary of the Academy  
 11:15.— Address by J. A. ALLEN on "Linnæus and American Zoölogy"

### AFTERNOON

- 2:00-4:00.— At the New York Botanical Garden, Museum Building, Bronx Park  
 Exhibition of American Plants known to Linnæus  
 In charge of L. M. UNDERWOOD, J. K. SMALL, P. A. RYDBERG, M. A. HOWE,  
 G. V. NASH  
 Exhibition of the Botanical Writings of Linnæus and of Portraits of Linnæus  
 In charge of C. B. ROBINSON, J. H. BARNHART  
 3:10.— Address by P. A. RYDBERG on "Linnæus and American Botany"  
 3:40.— Exhibition of selected lantern slides of Flowers of North American  
 Plants known to Linnæus. In charge of H. H. RUSBY  
 4:00-4:30.— Walk South from Museum Building through the Grounds of the Garden  
 to the Linnæus Bridge  
 W. A. MURRILL will point out characteristic American trees known to Linnæus  
 4:30.— At the Bridge over the Bronx River on Pelham Parkway  
 UNVEILING OF A BRONZE TABLET COMMEMORATING LINNÆUS  
 Address by the President of the Academy, and placing of documents in the tablet  
 Singing by the AMERICAN UNION OF SWEDISH SINGERS: "Hear us, Svea"  
 — *Wennerberg*

Acceptance of the tablet on behalf of the City of New York by the Hon. JOSEPH I. BERRY, Commissioner of Parks of the Borough of the Bronx

Acceptance of the key of the tablet by the New York Historical Society for safe keeping until May 23, 1957

Singing by the AMERICAN UNION OF SWEDISH SINGERS: "Battle Hymn"—*Lindblad*

Address by G. F. KUNZ, President of the American Scenic and Historic Preservation Society

Address by E. F. JOHNSON, President of the United Swedish Societies of New York

Singing by the AMERICAN UNION OF SWEDISH SINGERS: "Banner Song"—*Wennerberg*

5:15-6:30.— At the New York Zoölogical Park

Examination of the Collections with special reference to Animals known to Linnæus

In charge of W. T. HORNADAY, C. W. BEEBE, R. L. DITMARS, W. REID BLAIR

#### EVENING

8:00.— At the Museum of the Brooklyn Institute, Eastern Parkway

Opening address by F. A. LUCAS

Address by E. L. MORRIS on the "Life of Linnæus"

Musical number by the Glee Club of the UNITED SWEDISH SOCIETIES

Address by F. A. LUCAS on "Linnæus and American Natural History"

Musical numbers by the Glee Club of the UNITED SWEDISH SOCIETIES

Exhibition by means of lantern slides of "Plants and Animals known to Linnæus." In charge of Dr. A. J. GROUT, F. A. LUCAS

8:30-10:30.— At the New York Aquarium, Battery Park

(Admittance by invitation only)

Reception given by the New York Zoölogical Society to the New York Academy of Sciences and Guests

Demonstrations of features of Marine Life known to Linnæus

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Commemoration of the centennial of the Aquarium building

First view of the collections of the Aquarium by night. Music

NATHANIEL L. BRITTON

HERMON C. BUMPUS

WILLIAM T. HORNADAY

FREDERIC A. LUCAS

CHARLES H. TOWNSEND

WILLIAM MORTON WHEELER

*Committee*

EDMUND OTIS HOVEY, *Secretary*

American Museum Natural History

The carrying out of the plans of the Committee was made possible through a special fund of about \$1000, the subscribers to which were

Adams, Edward D.	Hess, Selmar
Adler, I.	Holden, E. R.
Amend, B. G.	Hooker, Miss Henrietta E.
Armstrong, S. T.	Hornaday, William T.
Atkins, George F.	Huntington, Archer M.
Avery, Samuel P.	Hussakof, L.
Barron, George D.	Jesup, Morris K.
Baskerville, Charles	Kaufman, Miss Pauline
Beck, F. C. T.	Kemp, James F.
Beckhard, Martin	Kuntz, C.
Berthoud, Edward S.	Kunz, George F.
Beuren, F. T. van	Lagerberg, J. de
Bird, Henry	Langeloth, I.
Bristol, John I. D.	Langmann, G.
Brown, Edwin H.	Levy, Miss Daisy
Bumpus, H. C.	Low, Seth
Bunting, Martha	Lucas, F. A.
Burgess, E. S.	Matthew, G. F.
Call, A. Ellsworth	McKim, H.
Cassabeer, H. A., Jr.	McMillin, Emerson
Chamberlain, Leander T.	McNeil, C. R.
Chandler, C. F.	New York Academy of Sciences
Chubb, S. H.	Nichols, John Treadwell
Cline, Miss May	Oettinger, P. J.
Cohn, J. M.	Osborn, H. F.
Corning, C. R.	Osborn, W. C.
Cox, C. F.	Osburn, Raymond C.
Davenport, Mrs. Elizabeth B.	Owens, William W.
Davidson, Miss Mary E. S.	Parsons, Mrs. Edwin
Davies, J. Clarence	Parsons, John E.
Dean, Bashford	Pederson, Frederick M.
Demorest, W. C.	Perkins, W. H.
Dodge, C. H.	Perry, C. J.
Donald, James M.	Phipps, Henry
Douglas, James	Pinchot, Gifford
Draper, Mrs. Henry	Post, Abram S.
Dunham, E. K.	Ramsperger, G.
Dwight, Jonathan, Jr.	Riker, Samuel
Dwight, Melatiah E.	Robb, J. Hampton
Foot, Miss Katharine	Robinson, Miss Winifred J.
Ford, James B.	Rydberg, P. A.
Frissell, A. S.	Seabury, George J.
Gooch, F. C.	Seitz, Charles E.
Greenwood, Isaac J.	Sellew, T. G.
Haupt, Louis	Shannon, William Purdy
Herrman, Mrs. Esther	Smith, Eugene



Stetson, Francis Lynde	White, I. C.
Stolpe, Mauritz	Wicke, William
Thorburn & Co., J. M.	Williams, R. S.
Townsend, C. H.	Wilson, Edward B.
Tuckerman, Alfred	Wood, Miss Cynthia A.
Watson, J. H.	Woodward, Robert S.

Yatsu, Naohidé

The Academy also acknowledges the co-operation of the American Museum of Natural History, the New York Botanical Garden, the New York Zoölogical Society, the Museum of the Brooklyn Institute of Arts and Sciences, the American Union of Swedish Singers and the Glee Club of the United Swedish Societies, in making the celebration dignified and successful.

After the inspection of the special exhibits in the American Museum, the literary exercises began with the reception by President Britton of the official delegates of societies as follows, each presenting the greeting of his society.

Royal Swedish Horticultural Society.....	J. de Lagerberg
Society of Friends of Natural Sciences, Ekaterinburg, Russia.....	George F. Kunz
Sociedad Cientifica "Antonio Alzate," Mexico.....	{ J. J. Stevenson C. T. Stevens J. F. Kemp
Boston Society of Natural History.....	J. A. Allen
Museum of Comparative Zoölogy.....	William Brewster
Natural History Society of West Newbury, Mass.....	William Merrill
American Journal of Science.....	Herbert E. Gregory
Connecticut Academy of Arts and Sciences.....	Alexander W. Evans
Linnæan Society of New York.....	Jonathan Dwight, Jr.
New York Botanical Garden.....	Addison Brown
New York Zoölogical Society.....	H. F. Osborn
American Museum of Natural History.....	G. H. Sherwood
Torrey Botanical Club.....	H. H. Rusby
New York Entomological Society.....	E. B. Southwick
New York Microscopical Society.....	J. L. Zabriskie
New York Historical Society.....	Samuel V. Hoffman
American Institute of the City of New York.....	Robert Rutter
Buffalo Society of Natural Sciences.....	T. G. Smith
Brooklyn Institute of Arts and Sciences.....	{ A. J. Grout F. A. Lucas
Staten Island Association of Arts and Sciences.....	Arthur Hollick
Maryland Academy of Sciences.....	C. C. Plitt
American Philosophical Society.....	J. W. Harshberger
American Entomological Society.....	J. W. Harshberger
National Academy of Sciences.....	H. F. Osborn
Biological Society of Washington.....	Edward L. Morris

Ohio Academy of Sciences.....	Raymond C. Osborn
Indiana Academy of Sciences.....	Guy West Wilson
Colorado Scientific Society.....	<div> <div>E. J. H. Amy</div> <div>E. M. Rogers</div> <div>B. B. Lawrence</div> <div>E. E. Olcott</div> <div>W. S. Morse</div> </div>

Telegraphic greetings were read from

The Royal Swedish Academy of Sciences, Stockholm  
 The Royal University, Upsala  
 The Royal Botanic Gardens, Edinburgh  
 The Royal Dublin Society, Dublin  
 The Gothenburg Society of Science, Gothenburg  
 The Imperial Academy of Sciences, St. Petersburg  
 The Uralian Natural History Society, Ekaterinburg  
 The Royal Linnæan Academy, Rome  
 The Botanical Garden, Rio de Janeiro

After the reading of these greetings, the Secretary submitted the following complete list of the societies, other organizations and individuals sending greetings.

#### Foreign Societies

The Linnæan Society, London  
 The British Association for the Advancement of Science, London  
 The Society of Arts, London  
 The Royal Cornwall Polytechnic Society, Falmouth  
 The Cambridge Philosophical Society, Cambridge  
 The North of England Institute of Mining and Mechanical Engineers, Newcastle-upon-Tyne  
 The Royal Scottish Geographical Society, Edinburgh  
 The Royal Botanic Garden, Edinburgh  
 The Royal Philosophical Society of Glasgow, Glasgow  
 The Royal Dublin Society, Dublin  
 Den Norske Gradmaalingskommission, Kristiania  
 The Royal Swedish Academy of Sciences, Stockholm  
 The Royal Swedish Horticultural Society, Stockholm (Delegate)  
 The Gothenburg Society of Sciences, Gothenburg  
 The Royal University of Upsala, Upsala  
 The University of Lund, Lund  
 The Geological Commission of Finland, Helsingfors  
 The Imperial Academy of Science, St. Petersburg  
 The Uralian Natural History Society, Ekaterinburg (Delegate)  
 Koninklijke Akademie van Wetenschappen te Amsterdam, Amsterdam  
 Senaat der Rijks Universiteit te Leiden, Leiden  
 Königlich Preussische Akademie der Wissenschaften, Berlin  
 Berliner Entomologische Verein, Berlin

Kommission zur wissenschaftlichen Untersuchung der deutschen Meere, Kiel  
 Kaiserliche Leopoldinisch-Carolinische deutsche Akademie der Naturforscher,  
 Halle, A.S.

Verein für vaterländische Naturkunde in Württemberg, Stuttgart  
 Thurgauische Naturforschende Gesellschaft, Frauenfeld  
 Kaiserliche Akademie der Wissenschaften, Wien  
 Regia Societas Scientiarum Bohemica, Prague  
 The Royal Hungarian Society of Natural Sciences, Budapest  
 The Transylvanian Museum Society, Kolszvar  
 La Société de Physique et d'Histoire Naturelle de Genève, Suisse  
 L'Akademie de Médecine, Paris  
 Société Linneénne de Normandie, Caen  
 Société des Amis des Sciences de Rouen, Rouen  
 Société Géologique du Nord, Lille  
 Université de Lyon, Lyons  
 La Société des Sciences de Nancy, Nancy  
 Société d'Histoire Naturelle de Toulouse, Toulouse  
 Real Academia de Ciencias Exactas, Fisicas y Naturales, Madrid  
 Specula Vaticana, Rome  
 The Royal Linnæan Academy, Rome  
 The Australian Museum, Sydney  
 Koninklijke Natuur Kundige Vereeniging in "Nederlandsch-Indie," Weltevreden  
 (Batavia)  
 Royal Society of Canada, Ottawa  
 Ottawa Field Naturalists' Club, Ottawa  
 Entomological Society of Ontario, Toronto  
 Sociedad Científica "Antonio Alzate," Mexico  
 The Botanical Garden, Rio de Janeiro  
 Museu Nacional do Rio de Janeiro

### Honorary Members

Sir Archibald Geikie, London	Professor Charles Barrois, Lille
Sir James Dewar, London	Prof. Dr. F. Leydig, Rothenburg
Dr. Hans Reusch, Kristiania	Professor Edward S. Dana, New Haven
Professor Hugo de Vries, Amsterdam	Dr. H. R. Storer, Newport
Professor A. A. W. Hubrecht, Utrecht	Professor A. E. Brown
Prof. Dr. Karl von den Steinen, Berlin	Professor George Macloskie, Princeton
Prof. Dr. Wilhelm Pfeffer, Leipzig	Professor Edward L. Berthoud, Boulder,
Prof. Dr. H. Rosenbusch, Heidelberg	Colorado

### Domestic Societies

Portland Society of Natural History, Portland, Me.  
 Natural History Club of West Newbury, West Newbury, Mass.  
 Boston Society of Natural History, Boston, Mass. (Delegate)  
 Boston Scientific Society, Boston, Mass. (Delegate)  
 Massachusetts Horticultural Society, Boston, Mass.

- Museum of Comparative Zoölogy, Cambridge, Mass. (Delegate)  
 Newport Natural History Society, Newport, R.I.  
 American Journal of Science, New Haven, Conn. (Delegate)  
 Connecticut Academy of Arts and Sciences, New Haven, Conn. (Delegate)  
 New York State Museum, Albany, N.Y.  
 Linnaean Society of New York, New York, N.Y. (Delegate)  
 New York Botanical Garden, New York, N.Y. (Delegate)  
 Torrey Botanical Club, New York, N.Y. (Delegate)  
 New York Entomological Society, New York, N.Y. (Delegate)  
 New York Microscopical Society, New York, N.Y. (Delegate)  
 New York Historical Society, New York, N.Y. (Delegate)  
 New York Zoölogical Society, New York, N.Y. (Delegate)  
 American Museum of Natural History, New York, N.Y. (Delegate)  
 New York Academy of Sciences, New York, N.Y. (Delegate)  
 American Scenic and Historic Preservation Society, New York, N.Y. (Delegate)  
 American Institute of the City of New York, New York, N.Y. (Delegate)  
 Medico Legal Society of New York, New York, N.Y. (Delegate)  
 United Swedish Societies of New York, New York, N.Y. (Delegate)  
 Brooklyn Institute of Arts and Sciences, New York, N.Y. (Delegate)  
 Staten Island Association of Arts and Sciences, New Brighton, N.Y. (Delegate)  
 New York State Education Department, Science Division, Albany, N.Y. (De-  
 gate)  
 Buffalo Society of Natural Sciences, Buffalo, N.Y. (Delegate)  
 Stevens Institute of Technology, Hoboken, N.J.  
 Academy of Natural Sciences of Philadelphia, Philadelphia, Pa. (Delegate)  
 American Philosophical Society, Philadelphia, Pa. (Delegate)  
 American Entomological Society, Philadelphia, Pa. (Delegate)  
 Zoölogical Society of Philadelphia, Philadelphia, Pa. (Delegate)  
 Carnegie Museum, Pittsburgh, Pa. (Delegate)  
 Natural History Society of Delaware, Wilmington, Del.  
 Maryland Scientific Society, Baltimore, Md. (Delegate)  
 National Academy of Sciences, Washington, D.C. (Delegate)  
 Smithsonian Institution, Washington, D.C. (Delegate)  
 Biological Society of Washington, Washington, D.C. (Delegate)  
 Library of Congress, Washington, D.C. (Delegate)  
 Philosophical Society of Washington, Washington, D.C. (Delegate)  
 Ohio Academy of Science, Gambier, O. (Delegate)  
 Indiana Academy of Sciences, Bloomington, Ind. (Delegate)  
 Wisconsin Academy of Sciences, Arts and Letters, Madison, Wis.  
 St. Paul Academy of Science, St. Paul, Minn.  
 Academy of Science of St. Louis, St. Louis, Mo.  
 Missouri Botanical Garden, St. Louis, Mo.  
 Colorado Scientific Society, Denver, Col. (Delegate)

The audience then listened to the following address.







Courtesy N.Y. Botan. Garden.

LINNÆUS AT THE AGE OF THIRTY, IN  
A. D. 1747.



Courtesy N.Y. Botan. Garden.

LINNÆUS AT THE AGE OF FORTY.

## LINNÆUS AS A ZOÖLOGIST.

By J. A. ALLEN, PH. D.

Carolus Linnæus, later known as Carl von Linné, was born at Råshult, in the province of Småland, Sweden, May 13, O.S., 1707, and died at Hammerby, near Upsala, on Jan. 10, 1778. His grandfather was a farmer; his father, a clergyman. Young Linnæus, the future naturalist, was intended by his parents for the ministry, and his early education was conducted with this end in view. At the age of ten he was sent to the Latin School at Wexiö, but after seven years at this school he was found to be so deficient in his scholastic studies that his parents thought of apprenticing him to a shoemaker.

While at Wexiö, much of his time was devoted to the study of plants and insects, an inclination apparently favored by his master, who was himself greatly interested in botany. Fortunately young Linnæus was rescued from his threatened degradation by Dr. John Rothman, a physician of Wexiö, who recognized his superior abilities, and appreciated his interest in natural history. He took him into his own home, where for a year Linnæus continued his botanical studies, aided by the advice and library of his patron. At the age of twenty he entered the University of Lund, where he soon found himself without means of support, through the death of his patron and friend, the kind-hearted physician of Wexiö. Fortunately he soon won the friendship of Dr. Kilian Stobæus, the professor of botany and medicine, who made him a member of his family. Here he had access to books and to a small museum of natural history, and found much leisure for exploring the neighboring country and for collecting objects of natural history. At the end of a year he went to Upsala, where, under Rudbeck and Roberg, he advanced rapidly in medicine and botany. Here he won the friendship of the renowned Olaf Celsius, whom he later characterized as the best botanist in Sweden, and of Artedi, a fellow-student, who afterwards became the founder of ichthyology. During his whole course at Upsala, it is said that he did not hear a single public lecture on either anatomy, botany or chemistry, but he and Artedi, in good-tempered rivalry, were devoting their energies to natural history,—Linnæus to plants, birds and insects, and Artedi to amphibia and fishes. Linnæus here also began the preparation of his epoch-making works on botany and of the first edition of his "*Systema Naturæ*," published a few years later in Holland.

In 1732, at the age of twenty-five years, he was commissioned by the Upsala Academy of Sciences to make a tour of exploration in Lapland in the

interest of natural history. He left Upsala on the 12th of May, and after an absence of five months returned to Upsala on the 10th of October. This remarkable journey of 4600 miles was made partly on horseback, partly by boat, and partly on foot; it extended northwestward across the Norwegian Alps to the coast of Norway beyond the Arctic Circle; the return journey was made by way of eastern Finland. It was an undertaking of great hardship and much danger, being performed alone, aided only by local guides employed to conduct the way from one point to another. On his return a report of his journey was presented to the Academy, but it remained in manuscript until translated and published in English by Dr. James Edward Smith, the first president of the Linnæan Society of London, in 1811.<sup>1</sup> The botanical results, however, were published separately by Linnæus himself, in 1737.

The following year was spent at Upsala, where he attempted to eke out his scanty means of support by giving lectures on botany, mineralogy and chemistry. This proved contrary to one of the statutes of the university, to the effect that no one should give public lectures who had not obtained his doctor's degree, which statute was invoked against him by Rosen, the successor to Rudbeck in the professorship of medicine and anatomy, who was jealous of Linnæus's abilities and attainments. Deprived of this financial resource, he took some of his pupils on excursions into the neighboring mountains, where he met the governor of the province of Dalecarlia, who sent him to explore and report on certain copper mines in which he was interested. While on this journey he gave lectures at Falun on mineralogy and assaying. Here he made the acquaintance of Dr. Moræus (a learned and wealthy physician of the district) and his two daughters, to one of whom he became betrothed; the father, however, insisted on deferring the marriage till Linnæus had completed his professional studies and obtained his medical degree. For this purpose, in the spring of 1735, he journeyed to Lubeck and Hamburg, and later to Holland, where, in June, he received from the University of Harderwijk the degree of doctor of medicine. At Leyden he became acquainted with the leading men of science of that city, which soon led to his engagement by Dr. George Clifford, a wealthy burgo-master of Amsterdam, to take charge, at a liberal salary, of his extensive

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<sup>1</sup> The herbaria, library (about 2500 volumes), manuscripts and correspondence of Linnæus, were offered by his widow and daughters, "by the advice of friends," to Sir Joseph Banks, "for the sum of a thousand guineas." Sir Joseph, not feeling inclined to the purchase, recommended it to the consideration of his friend, Dr. (later Sir) J. E. Smith, by whom these treasures were secured, and transferred to England (TUTTON, *Life and Writings of Linnaeus*, 1806, p. [39]), and later passed into the possession of the Linnæan Society of London, founded in 1788 through the efforts of Dr. Smith, who was its first president. (See JARDINE'S *Naturalist's Library*, Vol. I, 1833, p. 58.)

museum and botanic garden. Later he was sent by him to England to secure rare plants for his garden, with a letter of introduction from the great Boerhaave to Sir Hans Sloane. He thus came in contact with the botanists of London, where, however, his reception was not always cordial.

On his return to Holland he was offered the position of government physician to the Dutch colony in Surinam, which he prudently declined, and became an assistant to his friend Van Royen at the botanic garden in Leyden. After a brief visit to Paris he returned to Stockholm in September, 1738, where he determined to settle as a physician. Notwithstanding his fame abroad and his skill as a botanist, the pecuniary returns from his profession were at first small, but they gradually increased; and, obtaining some government patronage, his marriage to Miss Moræus was celebrated on June 26, 1739.

He remained only three years in Stockholm, during which period he helped to found the Royal Academy of Sciences of that city, and served as its first president. In 1741, under an order from the government, he made a journey through Öland and Gothland. In the same year he was called to the chair of botany at the University of Upsala, a position to which he had long aspired, and which he filled for thirty years, when impaired health compelled him to resign his official duties and to discontinue his literary labors. The University of Upsala, through the fame of Linnæus, became widely renowned as a seat of learning, and attracted students from various parts of Europe. During these years of almost uninterrupted activity, most of Linnæus's numerous botanical and other works were published, the material for which reached him in ever-increasing abundance, not only from distant parts of Europe, but from Siberia, China, India, Egypt, South Africa and North and South America.

Academic honors were showered upon him by all the learned societies of Europe; a gold medal was struck in his honor by the nobles of Sweden; and in 1757 he was created by King Frederic a Knight of the Polar Star, and admitted to hereditary nobility. Foreign courts made overtures for his presence, and his own country neglected no opportunity to do him honor. His death in 1778, after six years of invalidism resulting from an attack of apoplexy, was recognized as a national calamity; the University of Upsala went into mourning, and the King ordered a medal to be struck in his memory.

Although cramped by poverty during the earlier part of his career, prosperity did not long withhold her smile. Not only were the nobles of his country his patrons, but he was an especial favorite of both King Frederic and his queen. Through various emoluments showered upon him, he was able, later in life, to purchase a large estate and to construct for himself a



museum, wherein he gathered the largest collection of botanical treasures that at that time had anywhere been brought together. He was happy in his domestic relations, and lived to see his son succeed to his chair at the University of Upsala.

Although Linnæus's publications relate mainly to botany and medicine, they cover the whole realm of natural history. His earliest contribution to science is generally considered to be his "*Florula Lapponica*," the first part of which appeared in the Transactions of the Swedish Academy in 1732.<sup>1</sup> This was followed by the first edition of his "*Systema Naturæ*," published in Leyden in 1735. The "*Fundamenta Botanica*" followed in 1736, and was later enlarged and republished as the "*Philosophia Botanica*," in 1751. During the next ten years various other botanical publications appeared in rapid succession. His "*Fauna Suecica*," published in 1746, was his first special work relating to zoölogy. It is also notable as being the first work especially devoted to the entire fauna of any country. It was republished, with many additions, in 1761. Other botanical and several medical works followed during the next seven years, including his monumental "*Species Plantarum*," published in 1753. In the same year also appeared the "*Museum Tessianum*," consisting chiefly of descriptions of minerals and fossils, the latter mainly shells and corals, and in 1754 the "*Museum Adolphi Friderici*," relating exclusively to exotic animals. This was a folio with thirty-three plates, the most extensive and most elaborately illustrated of all of Linnæus's works. Two important medical works appeared in 1760, and his third zoölogical work, the "*Museum Ludovicæ Ulricæ*," in 1764, a thick octavo, to which was annexed the second part of the "*Museum Adolphi Friderici*."

During these thirty years of marvelous scientific activity, Linnæus also contributed many papers to the Transactions of the Upsala and Stockholm academies and to the "*Amœnitates Academici*." The latter, in ten octavo volumes, consist of dissertations or academical theses, mostly by his students, selected, edited and published by him, and thus may be regarded as of equal authority with his own writings. Seven of these volumes were published during his lifetime, and contain a number of his own minor papers.

This brief outline of Linnæus's life, his opportunities, and the published results of his scientific labors, affords the basis for the consideration of Linnæus as a zoölogist. As has been shown, he was primarily a botanist; he was also a mineralogist, an entomologist and a conchologist, but only incidentally a vertebrate zoölogist. In this field his interest was less strong, his opportunities for research the most restricted. His zoölogical writings,

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<sup>1</sup> His *Hortus Uplandicus* is said to have appeared one year earlier. See List of the Works of Linnæus, in Jardine's *Naturalist's Library*, Vol. I, 1833, p. xvii, footnote.

exclusive of a few minor papers, are comprised in the "Fauna Suecica," the "Museum Adolphi Friderici," the "Museum Ludovicæ Ulricæ" and the several editions of his "Systema Naturæ." The first edition, appearing in 1735, was a folio of only 12 pages, consisting merely of a conspectus of his Systema in tabular form. The second edition, published in 1740, was an octavo of 40 pages, in which were added, for the animal kingdom, the characters of the groups. The sixth, published in 1748, was greatly enlarged, the zoölogical part alone consisting of 76 pages, illustrated with six plates, or one for each of his six classes of animals. The tenth, published in 1758, was in two octavo volumes, of which the zoölogy formed the first volume, consisting of 824 pages. The twelfth, and the last edition revised by the author, was issued in three volumes, the first of which, containing the zoölogy and comprising 1427 pages, appeared in 1766. Thus in thirty-three years this work grew from a brochure of 12 pages to a work of 2400 pages.

The first edition of the Systema was published when the author was only twenty-eight years old, during his sojourn in Holland. He had never previously been beyond the confines of southern Sweden, except on his journey to Lapland and Finland in 1732, and he had had access to no large collection of animals. Thus his resources for such an important undertaking were extremely limited, being restricted to his own considerable first-hand knowledge of the fauna of Sweden, to the few specimens of exotic animals he had been able to see in Lund, Upsala and Stockholm, and to the scanty literature of the subject there available. When the second edition appeared, in 1740, he had spent less than three years and a half in foreign countries, mainly in Holland with single brief visits to London and Paris; but his interests on these occasions were botanical and not zoölogical.

The sixth edition (the third revised by the author), published in 1748, was in effect a synopsis of the fauna of Sweden, filled in, as regards the fauna of the rest of the world, by compilations from his predecessors. Strange as it may seem, outside of the tropical genera *Simia*, *Bradypus*, *Dasybus*, *Myrmecophaga* and *Manis*, this edition enumerates only thirteen species of mammals not found in Sweden. Only 140 are recorded for his whole class Animalium quadrupedum, one-third of which are Scandinavian.

This analysis could be extended to other classes with practically similar results. The class Insecta, for example, includes only thirteen species that are not also recorded in the "Fauna Suecica," showing how limited was his knowledge of the world's fauna at 1748.

The tenth edition (the fourth revised by the author), published in 1758, is the epoch-making work in the history of zoölogy, as in this the binomial system of nomenclature for the whole animal kingdom is introduced for the

first time. The work is also greatly enlarged, and the classification greatly improved, especially that of the mammals, which class is now for the first time aptly designated Mammalia. The ordinal term Primates is substituted for Anthropomorpha of the sixth and previous edition, the sloths (genus *Bradypus*) are removed from it, the genus *Lemur* is added as a new genus, and the bats are transferred to it from the Feræ. A new order, Bruta, is made up of his former third order Agriæ (now suppressed) and of such other extremely heterogeneous elements as the elephant, the manatee, sloths, ant-eaters and the scaly ant-eaters. The order Feræ consists of six properly associated genera; the armadillos, insectivores and bats, formerly included in it, being removed elsewhere. His fourth order, Bestiæ, is a new group, composed of the pigs, armadillos, opossums and insectivores. The fifth order, Glires, is a natural group, except for the inclusion of the genus *Rhinoceros*, now most strangely placed with the squirrels and mice. His sixth order, Pecora, is retained as in the previous editions, and is also a natural group. The seventh, Belluæ, is a new ordinal group, consisting of the genera *Equus* and *Hippopotamus*, transferred from the here disrupted order Jumenta of previous editions. The Cete, now removed by him from the fishes, form his eighth and last order. This reconstruction of the ordinal groups is a great improvement: five new genera are added, two old ones eliminated, and the number of species is increased from 140 to 185. In some of the other classes there are similar radical changes, but there is not time to refer to them.

The twelfth, and the last edition revised by the author, published in 1766, shows many improvements over the tenth. It is greatly increased in bulk through the addition of many new genera and a large number of new species. The classification is also judiciously modified at many points. Taking again the class of mammals for illustration, the number of orders is reduced from eight to seven, through the suppression of the grossly unnatural order Bestiæ and the transference of its genera to other associations, with, however, the retrograde change of placing the insectivores and the genus *Didelphis* among the Feræ. The Glires is modified by the removal of the genus *Rhinoceros* to the order Belluæ and the addition to it of *Noctilio*, a genus of bats. The order Bruta is the same incongruous association of elephants, manatees, sloths and ant-eaters as in the tenth edition.

The orders of mammals as now left correspond in several instances very nearly with those of our modern systems, notably the Primates, Glires, Pecora and Cete. The Feræ of the tenth edition corresponds to the modern Carnivora, but in the twelfth he made the mistake of putting back into it the marsupials and the insectivores. His order Belluæ being essentially the modern suborder Perissodactyla, his order Bruta is the only grossly incongruous association of types.

The only previous classification of mammals with which Linnæus's need to be compared is Ray's, published in 1693, whose system, taken as a whole, is far more artificial than Linnæus's. Naturally there are some striking coincidences of grouping, and in the characters employed by the two authors. As to the latter, Ray so well covered the field that there was little left for Linnæus to add, since during the interval between Ray and Linnæus not much was learned about the anatomy and relations of the ordinal groups of mammals. Doubtless Linnæus was influenced, in his removal of the cetaceans from the fish to the mammal class, by the systems of his contemporaries, Klein (1751) and Brisson (1756), in which respect only are their systems better or less artificial than his. Inasmuch, however, as Brisson divided mammals into eighteen orders instead of seven, he escaped some of the grotesque combinations made by Linnæus: on the other hand, he gave undue emphasis to relatively unimportant differences.

Linnæus's classification of birds is closely modeled upon that of Ray, and his departures from it are seldom improvements. His lack of knowledge of ornithology is strikingly apparent through his repeated association of very unlike species in the same genus, as where a penguin is combined with a tropic bird to form his genus *Phaëthon*, and another species of penguin with an albatross to form his genus *Diomedea*. In the tenth edition he recorded only about 550 species of birds; in the twelfth, this number was raised to nearly a thousand, mainly on the basis of Brisson's great work, which appeared in 1760. The greater part were based on the writings of previous authors; probably less than one-fourth of them being known to him from specimens.

His class Amphibia contained four orders, of which the fourth consisted of cartilaginous and other wholly unrelated fishes, and shows how slight was his acquaintance with the lower classes of vertebrates. His first order, Reptilia, includes such diverse animals as turtles, lizards, salamanders, frogs and toads. The snakes formed his second order, Serpentes.

His arrangement of the fishes was originally based on that of Artedi, whose "Ichthyologia" Linnæus published while sojourning in Holland, in 1738, after Artedi's untimely death by accidental drowning.

His class Insecta is nearly equivalent to the modern subphylum Arthropoda, as it includes the Arachnida and the Crustacea.

His class Vermes was the waste-basket of his system, including all the forms of animal life that were neither vertebrates nor insects, which he distributed into five orders, some of them as heterogeneous in character as the class itself. The second order, Mollusca, comprised all sorts of soft-bodied animals, mostly marine, as slugs, sea-anemones, ascidians, holothurians, cuttle-fishes, star-fishes, sea-urchins and jelly-fishes. The animals now commonly known as Mollusca formed his third order, Testacea.



It is not, however, just to judge Linnæus's work by the standards of to-day. The above comparison of the zoölogical part of the "*Systema Naturæ*" with our present knowledge of animals is not to be taken as a disparagement: we merely note the progress of zoölogy during the last century and a half of the world's history. Linnæus was a born systematist; his energy and industry were enormous; his isolation promoted independence and originality. He devised new classifications, and thoroughly systematized not only the knowledge of his predecessors, but the vast increment he himself added. He inspired his students with his own enthusiasm, taught them his own advanced methods, and influenced a goodly number of them to undertake natural history explorations in distant and zoölogically unknown parts of the world.

In special lines of research he was far behind several of his contemporaries, notably Brisson, in respect to both mammals and birds. But he nearly doubled the number of known forms of reptiles, amphibians and fishes, and increased many fold the number of species of Coelenterates, on the basis of wholly new material gathered through his own efforts.

Disgusted with the needlessly detailed accounts and repetitions that characterized the writings of most of his predecessors, he unfortunately adopted the extreme of condensation, thereby adding greatly to the difficulties of his successors in determining to just what forms the thousands of new names he introduced really belonged. Many of his species, based on the accounts given by previous authors, were also composite, often containing very diverse elements. But this detracts little from his credit. As one of his appreciative biographers has tersely put it, "He found biology a chaos; he left it a cosmos."

Linnæus's beneficent influence upon biology was hardly less as a nomenclator than as a taxonomist. He not only invented a descriptive terminology for animals and plants, but devised a system of nomenclature at once simple and efficient, and which for a hundred and fifty years has been accepted without essential modification.

Linnæus divided the three kingdoms of nature into classes, the classes into orders, the orders into genera, the genera into species, under which latter he sometimes recognized varieties. Of these groups, as he understood them, he gave clear definitions, but they were in most cases much more comprehensive than the limits now assigned to groups of corresponding rank. His genera correspond in some cases to groups now termed orders, and frequently to the modern idea of family; in some cases they contained species now placed in separate orders. Prior to Linnæus, these groups had less definite significance, and were often designated by a phrase instead of a single word. Species were indicated only by a cumbersome diagnosis

intended to express their chief distinctive characters. For this, Linnæus substituted a single word, an innovation the merits of which were at once almost universally recognized. But Linnæus reached this solution of a grave inconvenience somewhat slowly, and not till 1753 did he fully adopt the *nomen triviale*, when he introduced it into botany in his "Species Plantarum," which is taken by botanists as the point of departure for the binomial system. In the following year, 1754, he introduced it into zoölogy, using it throughout his "Museum Adolphi Friderici" for all the animals catalogued or described in this superb work; namely, 39 species of mammals, 23 of birds, 90 of reptiles and amphibians, 91 of fishes and 64 of invertebrates, or for an aggregate of 307 species of animals. Four years later, in the tenth or 1758 edition of his "Systema Naturæ," he adopted it for the whole animal kingdom, which date is now generally taken as the beginning of the binomial system for zoölogy. The importance and utility of this simple innovation in a matter of nomenclature are beyond estimate, and if Linnæus had done nothing else for the advancement of biology, he would be entitled to a conspicuous niche in the temple of fame and to the gratitude of all subsequent workers in this field. He for the first time gave technical standing to the systematic names, both generic and specific, of all the plants and animals known at the dates when he introduced the *nomen triviale* into the nomenclature of botany and zoölogy.

It is of interest in this connection to note the number of species of animals known to Linnæus at the date of publication of the last edition of the "Systema Naturæ,"—the number known to him personally, and the number recorded respectively from North America and from South America.

Of mammals, the whole number of species recorded is 190, of which three-fourths are based on the descriptions of previous authors. Only 48 were American,—12 from North America and 36 from South America. The 5 North American mammals known to Linnæus from specimens were the raccoon, star-nosed mole, common mole, flying squirrel and chipmunk. The number of species at present known from North America is 600, excluding subspecies. The number for the world, including the extinct as well as the living, is about 10,000 as against less than 200 recorded by Linnæus.

Of birds, about 925 are recorded of the 15,000 known to-day. The 200 known from America are divided about equally between North America and South America, only 50 of which were described from specimens.

The amphibia and reptiles number collectively about 250, of which about one-third are American, 40 per cent of the latter being North American and 60 per cent South American. The North American include 3 salamanders, the box-turtle, the six-lined lizard, the blue-tailed lizard and 14

snakes. The greater part of the 20 North American species of reptiles and amphibians known to him personally were based on specimens transmitted by his former student, Dr. C. D. Garden, from the Carolinas, and on a few sent from Pennsylvania by Pehr Kalm, also one of his students. Thus the greater part of the snakes of the eastern United States became known to Linnæus prior to 1766.

About 500 species of fishes are recorded, of which 100 are American, divided about equally between North and South America. Forty of the nearly 60 North American species described are based on specimens sent from the Carolinas by Dr. Garden, the others mainly on specimens in the museum of King Frederic.

There is not time to notice in detail the various classes of Cœlenterates. A few words about insects will serve as a general illustration for this phylum. Linnæus recorded about 2400 species, the greater part of which he was the first to describe; about 300,000 are now recognized. Of the insects known to him, 65 per cent are recorded in the second (1761) edition of his "Fauna Suecica," and many of the remainder are European, so that his knowledge of exotic species was exceedingly restricted. Of Coleoptera he recorded about 800 species; the number now known is estimated at 12,000. Of Lepidoptera he recorded about 800; 7000 are now known from North America alone. Of Diptera he recorded 278 species, of which 200 were from Sweden; 12,000 are now known from North America.

Linnæus's system of classification was based on a few external characters, and was recognized by himself as artificial and provisional. It was intended only as a stepping-stone to better things, when the structure and affinities of animals should become better known. The statistics already given indicate how limited was his knowledge of the world's fauna; his classification of animals shows how little he knew of their structure, and how often he was misled by superficial resemblances. Yet his "Systema Naturæ" was the working basis of all naturalists for the next half-century.<sup>1</sup> Twelve editions were published during his lifetime, and it was later translated into several of the continental languages. To such an extent was it regarded as final by many subsequent naturalists that, when his groups began to be changed and new genera interpolated, it was deemed by some of them little less than sacrilege. When convenience demanded subdivision of the larger genera, owing to the great number of new species that had become known since 1766, it

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<sup>1</sup> Turton, in his *Life and Writings of Linné*, says, "To this system may be justly applied the nervous observations of Dr. Johnson, in his delineation of the character of Shakespeare: 'The stream of time, which is continually washing away the dissoluble fabrics of other systems, passes without injury by the adamant of Linné.'" — WILLIAM TURTON: *A General System of Nature . . . by Sir Charles Linné*, Vol. VII, 1806, p. [42].

was quite common to consider the new groups as sections, and to give them merely vernacular names, or, if their authors were bold enough to designate them by Latin names, they were commonly called subgenera.

It was not till near the close of the eighteenth century that there arose a new class of naturalists, the anatomical school, led by the elder Geoffroy and G. Cuvier, who studied the internal structure of animals as well as their external parts. It was, however, many years before the new systems began to displace or greatly to modify the long-accepted and strongly intrenched Linnæan methods of grouping animals.

The great advance in biologic knowledge since the time of Linnæus cannot be easily measured; it can be suggested by noting the fact that comparative anatomy, embryology, histology, paleontology, evolutionism and many kindred lines of research, have nearly all had their origin or principal development within the last century, all converging for the solution of the genetic relationships of animals and the origin of life. Linnæus, in an oration delivered in 1743,<sup>1</sup> held that each species of animal originated from a single pair, citing as incontrovertible proof the Mosaic account of the creation. It is indeed a long look back to the middle of the eighteenth century, when his labors marked a new era in the history of biology. In commemorating to-day the two hundredth anniversary of his birth, we honor ourselves by showing our esteem for the greatest naturalist of the eighteenth century.

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<sup>1</sup> In his oration *De telluris habitabilis incremento*, delivered and first published in 1743 and republished in 1744, and again in the second volume of the *Amœnitates Academicæ*, in 1751, he gives his reasons for believing "that at the beginning to the world there was created one single sexual pair of every species of living thing.

"To the proofs of this proposition," he continues, "I request those who are my auditors to lend a favorable ear and willing attention.

"Our holy Faith instructs us to believe that the Divinity created a single pair of the human kind, one individual male, the other female. The sacred writing of Moses acquaint us that they were placed in the Garden of Eden, and that Adam there gave names to every species of animal, God causing them to appear before him.

"By a sexual pair I mean one male and one female in every species where the individuals differ in sex." — J. F. BRAND'S translation, in *Select Dissertations from the Amœnitates Academicæ*, 1781, pp. 75, 76.



The following address was prepared for the celebration, but was read only by title. It is inserted here on account of its close relations with the address of Dr. Allen.

LINNÆUS AS AN INTERMEDIARY BETWEEN ANCIENT AND  
MODERN ZOÖLOGY; HIS VIEWS ON THE CLASS  
MAMMALIA.

By W. K. GREGORY, M. A.

In connection with the two hundredth anniversary of the birth of Carl von Linné, or Carolus Linnæus, it may not be inappropriate to consider him in his capacity of bridging over the gap between ancient and medieval zoölogy on the one hand and modern zoölogy on the other, and further to glance at the principles and facts upon which he based his two great contributions to the broader knowledge of the class of which man is the dominating member. For this purpose the history of zoölogy may be divided, in a general way, into seven epochs: the Aristotelian, the Scholastic, the Renaissance, the Raian, the Linnæan, the Cuvierian, and the Darwinian. There are also two axioms which it will be well to bear in mind. The first is, that Linnæus became a point of departure in the history of modern biology, only because he was in turn the product of the intersection of many important historical series which ramify and intertwine indefinitely, and stretch back into the remote past of every aspect of life. The second axiom is, that every new idea, or, for that matter, every new event, is the fertile hybrid resulting from the fortuitous crossing of several specifically distinct old ideas or events.

THE ARISTOTELIAN EPOCH.

The first epoch under consideration is that of Aristotle, of the fourth century B.C., and it may be characterized as the initial analytical epoch. Aristotle's theory of the genetic relationship of the chain of beings from polyp to man did not, of course, materially influence Linnæus. The idea of evolution was not destined to come to its fruition through Aristotle, the schoolmen, or even in Linnæus or Cuvier. The true relation of Aristotle as a systematic zoölogist to Ray and Linnæus is exhibited in the following well-known citations from "The Parts of Animals."

"Some animals are viviparous, some oviparous, some vermiparous. The viviparous are such as man and the horse, and all those animals which have hair; and of the aquatic animals, the whale kind, as the dolphin and cartilaginous fishes [in reference to the viviparity of certain sharks] (Book I, Chap. V). Of quadrupeds which have blood and are viviparous, some are (as to their extremities) many-cloven, as the hands and feet of man. For some are many-toed, as the lion, the dog, the panther; some are bifid, and have hoofs instead of nails, as the sheep, the goat, the elephant,

the hippopotamus; and some have undivided feet, as the solid-hoofed animals, the horse and ass. The swine kind share both characters [an allusion to the 'mule footed' swine, monstrosities in which the median digits are fused, and terminate in a solid composite hoof] (Book II, Chap. V).

Ray and later writers probably had this passage in mind when they used the descriptive terms "multifido," "bifido," "solidungula," "ungulata," "unguiculata," "fissipedes." Here, also, attention is directed to the feet as exhibiting characteristic differences. In another passage Aristotle says,—

"Animals have also great differences in the teeth both when compared with each other and with man. For all quadrupeds which have blood and are viviparous have teeth. And in the first place some are ambidental<sup>1</sup> (having teeth in both jaws); and some are not so, wanting the front teeth in the upper jaw. Some have neither front teeth nor horns, as the camel; some have tusks,<sup>2</sup> as the boar; some have not. Some have serrated teeth,<sup>3</sup> as the lion, the panther, the dog; some have the teeth unvaried,<sup>4</sup> as the horse and the ox; for the animals which vary their cutting teeth have all serrated teeth. No animal has both tusks and horns; nor has any animal with serrated teeth either of those weapons. The greater part have the front teeth cutting, and those within broad" (Book I, Chap. II).

This passage evidently directed the attention of later writers to the importance of the teeth as a means of distinguishing and hence of classifying mammals, and we shall see that Ray and, later, Linnæus were quick to avail themselves of the suggestion.

Aristotle was quite unconscious of the classification that has been ascribed to him, as Whewell<sup>5</sup> shows; but "Aristotle does show, as far as could be done at his time, a perception of the need of groups and of names of groups in the study of the animal kingdom, and thus may justly be held up as the great figure in the prelude to the formation of systems which took place in more advanced scientific times." Whewell also quotes passages that show Aristotle's recognition of the lack of generic names to denominate natural groups. Aristotle says that "of the class of viviparous quadrupeds there are many genera,<sup>6</sup> but these again are without names, except specific names, such as man, lion, stag, horse, dog and the like. Yet there is a genus of animals that have manes, as the horse, the ass, the *oreus*, the *ginnus*, the *innus* and the animal which in Syria is called *heminus* (mule) . . . Wherefore," he adds (that is, because we do not possess genera and generic names of this kind), "we must take the species separately and study the nature of each." "*These passages*," Whewell continues, "*afford us sufficient ground*

<sup>1</sup> Ἀμφόδοντα.

<sup>2</sup> Χαιλιόδοντα.

<sup>3</sup> Καρχαρόδοντα.

<sup>4</sup> Ἀνεπαλλακτα.

<sup>5</sup> *Op. cit.*, III., p. 350.

<sup>6</sup> Εἶδη.

*for placing Aristotle at the head of those naturalists to whom the first views of the necessity of a zoölogical system are due" (Op. cit., p. 352).*

### THE SCHOLASTIC EPOCH.

From the time of Aristotle and his classical successors until the rise of scholasticism in the eleventh century, Europe, as every one knows, was too much preoccupied with world-wide displacements and readjustments of peoples and of institutions to pay particular attention to natural science; and even the Scholastic Epoch in the history of philosophy and science was chiefly occupied with the further development and systematization of the great body of religious and metaphysical doctrines. So far as natural history is concerned, it is perhaps rather a further interregnum than an epoch, rather an era or lapse of uneventful time than a time of the slow ascension of some great illuminative idea. The anthropocentric idea dominated in natural history as the geocentric idea dominated in astronomy; hence a knowledge of the real or supposed properties of animals and particularly of plants was chiefly cultivated in connection with alchemy, magic and *materia medica*. The medieval imagination, full of mysticism, eager for the uncanny and fantastic and teeming with images of ubiquitous devils, flourished on the marvelous tales of a "Sir John Maundeville," and peopled the earth with the monsters which so long survived and ramped in the *Terræ Incognitæ* of world maps. In the schools, citations from authorities were accepted in lieu of proof, and the simple zoölogy of Aristotle and the scriptures was deeply covered by the accretions of learned exegesis.

Scholasticism reached its prime as early as the thirteenth century, in the system of the illustrious St. Thomas Aquinas, the "*princeps scholasticorum*." Afterward, while the renaissance movement was discovering new worlds in all directions, scholasticism in general (but with some brilliant exceptions) rapidly reached the "phylogerontic stage" of its evolution, and produced all sorts of bizarre specializations in terminology and in dialectics.

It has been said of the scholastic philosophy that it "vigorously exercised the understanding without bringing it to any conclusions." However this may be, it cannot be doubted that the very excesses of scholasticism stimulated the reactive return to experience, which gave rise incidentally to biological science. The schoolmen furthermore perpetuated and aroused interest in Aristotle's analyses, and gave currency to many methods of analysis and description. Among these we may cite, first, the dichotomous method of division, which is a forerunner of modern classifications; second, the logical concepts of genus and species. Especially noteworthy was the expansion of classical Latin into a highly specialized language of philosophy and science.



## THE RENAISSANCE EPOCH.

Biological science, and especially zoölogy, did not respond fully to the impulse of the Renaissance movement until literature, politics, astronomy and geographical discovery had made the most signal advances. Hence in Aldrovandi (1522–1605) and Gesner (1516–65) the superstitions and myths of the middle ages still linger, while the systematic work of future generations is initiated in the extensive illustrated catalogues and descriptions of plants and animals. On the philosophical side of zoölogy, the Englishman Wotton, in his “*De Differentiis Animalium*” (Paris, 1552), “rejected the legendary and fantastic accretions [of medieval zoölogy] and returned to Aristotle and the observation of nature” (Lankester<sup>1</sup>). One of the contemporaries of Gesner and Wotton was the founder of anatomy, Andreas Vesalius (1514–64), who boldly broke with tradition, and declared that the source of knowledge of the human body should be, not Galen, but the human body itself.

Near the end of this period, the botanist, Cesalpino (Cæsalpinus) of Arezzo (1519–1778), a celebrated scholastic philosopher, published his voluminous work “*De Plantis*” (1583). In this work, which was inspired by the new idea of direct observation, the confused arrangements of plants of the earlier herbalists were replaced by an orderly classification suggested by the brigades of an army, and founded upon the number, the position and the figure of the reproductive parts. He divided plants into ten great classes, which were again subdivided; to these assemblages he gave monomial names in substantive form. Linnæus himself says of him, that, “though the first in attempting to form natural orders, he observed as many as the most successful later writers” (Whewell, *Op. cit.*, pp. 282, 283).

A reason for this precocious development of a natural classification of plants may be sought in the very multiplicity of kinds and the large herbaria and horticultural gardens in existence, which necessitated some sort of orderly arrangement and which would assist the eager student to recognize related series. We note in contrast the delayed progress of the classification of the mammals due to the comparative fewness of known forms, the greater complexity of organization and the difficulties of observation.

## THE RAIAN EPOCH, THE DAWN OF MODERN ZOÖLOGY.

Among those who contributed the data for Linnæus’s generalizations, no name is more important, at least in the history of vertebrate zoölogy, than

<sup>1</sup> E. Ray Lankester, *The History and Scope of Zoölogy*, in *The Advancement of Science* London, 1890, p. 293.

that of John Ray. Accordingly, the fourth epoch under consideration may be termed the Raian Epoch, and culminates with the publication in 1693 of Ray's "*Synopsis Methodica Animalium Quadrupedum et Serpentine Generis*," which is one of the great landmarks in the history of classification. Ray's debt to the past is shown in the facts that his lucid tabular analyses of the common structural features of animals are arranged dichotomously; that in each division and subdivision a single adjective or adjectival phrase indicates the most important common feature of the animals in question, and that these terms are, as we have seen, in many cases borrowed from Aristotle.

Ray, like Linnæus, gave more attention to plants than to animals, and depended upon his colleague, Willughby, for much of the data, especially in the fishes. Like Linnæus also, Ray had a superb gift of order and a philosophical mind that made him a worthy countryman and contemporary of Sir Isaac Newton.

In his tabular analysis, Ray distinctly foreshadows Linnæus in the following points: —

1. The higher vertebrates are contrasted with the fishes as breathing by lungs instead of gills.

2. The whales are classed with the viviparous animals and expressly removed from the fishes, from which they were further distinguished by the horizontality of the tail-fin. This step, however, was felt to be so radical that Ray afterwards constructed a definition which included both whales and fishes.

3. As remarked by Gill, the terrestrial or quadruped mammals are bracketed with the aquatic as "*Vivipara*," and contrasted with the "*Ovipara*" or "*Aves*." "The *Vivipara* are exactly co-extensive with *Mammalia*, but the word '*vivipara*' was used as an adjective and not as a noun."<sup>1</sup> This distinction seems to have been an important one, when substance was so carefully distinguished from attribute. Ray emphasized the common *attributes* of all the terrestrial hairy quadrupeds, of the amphibious hairy animals such as the seals and manati, and of the purely aquatic and fish-like Cetaceans; but he does not seem to have insisted that all these animals agreed in essence and substance as well as in attribute, so that they should require a new substantive name such as Linnæus afterward applied to them.

4. The double ventricle is noted as characteristic of both *Vivipara* and *Ovipara*.

5. In order to associate the "manati" and other amphibious mammals with their terrestrial congeners, the term "hairy animals" is employed as more comprehensive than quadrupeds.

<sup>1</sup> The Story of a Word Mammal, in *Popular Science Monthly*, Vol. LXI. September, 1902, pp. 434-438.

Ray further set the standard for Linnæus in his concise descriptions of European and foreign mammals, especially those described by travelers in America and in the East. Ray often used the term "species" merely as the equivalent of the middle English "spece," which survives in our word "spice," and meant "kind:" it was also equivalent to the logical "species" (*cf.* the Greek εἶδος) of the schoolmen, and is exemplified in Ray and Willughby's "Historia Piscium" in such phrases as "clarias niloticus Belonii mustelæ fluviatilis species," "bagre piscis barbati ac aculeati species." But Ray also used the term "species" in quite a Linnæan manner, as in the names *Ovis laticauda*, *Ovis strepsiceros* and *Ovis domestica*. In form, at least, this foreshadows the binomial system of nomenclature and the recognition of the species in general as a supposedly objective reality and the unit of classification. The form of Ray's specific definitions seems, however, to imply that the term "species" in Ray's mind was often more a "differentia," or specific adjective modifying the generic concept than a fully developed substantive name, and Ray did not apparently realize the convenience of applying the binomial method of nomenclature universally. Even Linnæus at first introduced the specific, "trivial," or common name, merely as a marginal index or symbol of the full specific phrase. Ray recognized the considerable variability of species, but believed also in their separate creation and fixity. He frequently adverts to the internal characters of animals; and his book shows, that even by his time a considerable number of observations on the soft parts of animals had already accumulated.

#### THE LINNÆAN EPOCH.

The work of Ray in botany and zoölogy fully prepared the way for Linnæus, whose epoch may be characterized as the Legislative Epoch, because his methods of description and classification, and especially his nomenclature exerted such profound formative and regulative influence upon the work of his contemporaries and successors that he was called the "lawgiver of natural history."

#### *Linnæus's Broader Contributions to the Class Mammalia.*

One of the most enduring claims of Linnæus upon the grateful memory of posterity arises from his felicitous coinage of the word "mammalia" (animals with mammae or breasts after analogy with Latin words like animal<sup>1</sup>) as a class name for the forms characterized by Ray as "viviparous hairy animals." Thus not only the terrestrial hairy oviparous quadrupeds,

<sup>1</sup> Theodore Gill, *l. c.*

but also the aquatic Vivipara now called Cetaceans and Sirenians, were for the first time definitely included under a single class name.

In attempting to appraise Linnæus's contributions to the broader knowledge of the class of mammals, we must bear in mind what Dr. J. A. Allen has well shown,<sup>1</sup> namely: that Linnæus was primarily a botanist, that his interest in mammals was incidental, that his opportunities for studying them were very limited, that his first-hand knowledge of extra-European mammals was practically *nil*, and finally that several of his ordinal groupings of mammals (*e. g.*, rhinoceros with the rodents) now appear highly unnatural and even ludicrous.

On the other hand, there are certain considerations which may prevent us from thinking any the less of his judgment and genius on that account. Although Linnæus may have known very little about extra-European mammals, he had, nevertheless, a fairly good conception of the essential features of mammals as a class, as shown by his definition in the tenth edition of the "*Systema Naturæ*" (1758). Here in concise phrase he states that mammals have a heart with two auricles and two ventricles, with hot red blood; that the lungs breathe rhythmically; that the jaws are slung as in other vertebrates, but "*covered*," *i. e.*, with flesh, as opposed to the "*naked*" jaws of birds; that the penis is intromittent; that the females are viviparous, and secrete and give milk; that the means of perception are the tongue, nose, eyes, ears and the sense of touch; that the integument is provided with hairs, which are sparse in tropical and still fewer in aquatic mammals; that the body is supported on four feet, save in the aquatic forms, in which the hind limbs are said to be coalesced into a tail (the only erroneous idea in the whole definition).

Many of these characters had previously been noticed by Ray in his description of the hairy quadrupeds. It is not impossible, too, that Linnæus may have been assisted to the comprehension of the essential features of the mammals through his friendship with Bernard de Jussieu, who is said by Isidore Geoffroy Saint-Hilaire to have induced him to include the Cetaceans in the class Mammalia; and possibly he also owed something to the researches of Klein and Brisson. In spite of all this, Linnæus's own studies in medicine, in Holland, doubtless made him familiar with the anatomy of at least one mammal, man; and on his journeys through the north of Europe he must have observed many other mammals at close range.

Thus was Linnæus prepared for the clear recognition and emphasis of another fact of far-reaching importance. It was evidently well known that the anatomy of the hairy quadrupeds was similar in plan, if not in detail,

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<sup>1</sup> See pp. 9 ff.



to that of man, and we find Descartes (for example, in his "Discourse on Method" Part V., 1637) advising those who wished to understand his theory of the action of the lungs and circulatory system, "to take the trouble of getting dissected in their presence the heart of some large animal possessed of lungs, *for this is throughout sufficiently like the human*" (ital. mihi). And it was further known that of all animals the monkeys are most nearly like man, both externally and internally. This was asserted by Aristotle and other classical authors, but was fully demonstrated in a carefully prepared and illustrated work<sup>1</sup> on the anatomy and appearance of animals from the Jardin du Roi, by a committee of savants of the French Academy, appointed by the Grand Monarch.

This work and these important observations may or may not have come under the notice of Linnæus on the occasion of his visit to Paris in 1738. At any rate, he did not hesitate to follow the logical consequences of these facts, namely, that in a strictly zoölogical classification, man would be grouped not only in the class Mammalia, but even in the same ordinal division with the monkeys. Accordingly, in the tenth edition of the *Systema* the earlier name *Anthropomorphæ* is replaced by *Primates*, and the genera *Homo*, *Simia*, *Lemur* and *Vespertilio*, are grouped under that order. The *Primates* were thus regarded as the chiefs of the hierarchy of terrestrial beings, and consequently, as in nearly all subsequent schemes down to the Darwinian Epoch, head the classified legions of creatures. Linnæus was too often at fault in surmising the generic and ordinal affinities of the species of the lower vertebrates; but this bold allocation of man to the order *Primates* surely bears the marks of genius, and led the way to the modern generalization that man is knit by ties of blood kinship to the *Primates*, and more remotely to the whole organic world.

*Linnæus's Principles in his Classification of the Mammalia.*

The diagnostic definition given by Linnæus of the order *Primates* may be cited because it rests upon the principles and theories which guided him in classification and which led to his most successful groupings, as well as to his serious blunders. This definition is as follows:—

Inferior front teeth iv, parallel, lanariform [canine] teeth solitary [that is, in a single pair above and below].

Mammæ pectoral, one pair.

The anterior extremities are hands.

The arms are separated by clavicles, the gait usually on all fours ("incessu tetrapodo volgo").

They climb trees and pluck the fruits thereof.

<sup>1</sup> Mémoires pour servir à l'histoire naturelle des animaux, à la Haye, 1715 (4to, 2 vols.), redigées par Perrault et Dodart.

This definition was clearly insufficient to exclude all extraneous genera from this really natural order; for (1) under *Lemur* Linnæus included, not only all the then known forms now recognized as the suborder Lemuroidea, but also the "Flying Lemur," *Galeopithecus*, which properly either forms an order by itself with no near affinities with the Primates, or is at most a suborder of the Cheiroptera; (2) the definition also included "*Vespertilio*," i. e., the bats, excepting *Noctilio*, an order more nearly related to the Insectivores than to the Primates.

Many of the characters selected by Linnæus for his ordinal diagnoses were of the "adaptive" or superficial kind, which are now known to have been most easily modifiable by changes in the external or internal environment. The reason for this mistake was, that Linnæus regarded the mode of sustenance of a group as one of its most deep-seated attributes and most surely indicative of more or less hidden affinities with other groups. Linnæus was constantly searching for natural groups, but he did not realize that the natural affinity of the members of the larger groups was due to descent from common ancestors, just as in the case of members of the same species. An example of his reliance upon sustenance is seen in his definition, in the tenth edition of the *Systema*, of the order *Feræ*, the Carnivora of later authors. Here "sustenance by rapine, upon carcasses ravenously snatched" is evidently felt to be connected with "front teeth in both jaws: superior vi, all acute," with "laniariform teeth [canines] solitary," with "claws on the feet acute."

One of his dicta in botany was, that a character of great systematic importance in one group may be very variable in another; consequently he did not mention "sustenance" under *Bruta*, but contented himself with the two characters "front teeth none either above or below" and "gait awkward (*incessus ineptior*)."  
As this order included the elephant, the manatee, the sloth, the great ant-eater and the scaly ant-eater, it has been justly cited as a grossly unnatural assemblage, and the grouping accounted for by Linnæus's ignorance of the animals composing it.

Now it is possible that Linnæus himself did not regard this assemblage as natural, but merely as a convenient artificial grouping. But I am more disposed to attribute its existence to his habit of searching for hidden affinities below the most obvious external differences, as when he placed the seals in the order *Feræ*, joined the bats with the Primates, the horse and the hippopotamus, the rhinoceros with the Rodents, and the pig with the Insectivores (in the order *Bestiæ*).

Linnæus recognized that the ordinal classification of the mammals was a difficult problem, as is shown by the conspicuous changes (not always improvements in our eyes) and redistributions which he made between the

first and "tenth" editions of the *Systema* and further by the fact that Erxleben, who revised and extended the *Systema* (1777), abandoned the ordinal divisions entirely and merely listed the genera *seriatim*. The difficulty of the problem is indicated by the fact that Cuvier, with far better material and more extensive knowledge, was constantly deceived by "adaptive" (or homoplastic) resemblances. Even Cope, who wrote much on homoplastic and convergent evolution, was himself deceived by the similarities of structure in the marsupial "mole," *Notoryctes*, and the Cape golden mole, *Chrysochloris*, an undoubted insectivore.

The most "inexcusable" blunder of Linnæus, that of placing the rhinoceros with the Rodents under the order "Glires," may have been due, not to carelessness, but to the fact that the Indian rhinoceros has a single pair of close-set cutting incisors in the upper jaw, which oppose the elongate incisor-like appressed canines of the lower jaw and thus show a superficial approach to the rodent dentition. If Linnæus had known that *Hyrax*, which Pallas described as a Rodent ("*Cavia*"), had cheek-teeth like those of *Rhinoceros*, he doubtless might have felicitated himself upon his supposed astuteness.

In brief, Linnæus, as fully shown by Whewell,<sup>1</sup> from his profound and wide botanical knowledge, was acquainted with many natural orders, and strove constantly to recognize others. He knew that a character of great diagnostic and fundamental value in one order may be of slight value in another; he knew that even in a natural order some of the diagnostic and fundamental characters might be absent in certain members otherwise clearly allied to a given series. He knew that a natural series is "natural" because of the totality of its characters, that the "genus makes the character," and not *vice versa*, a hard doctrine to many of his contemporaries. When Linnæus had arrived at a conception of any given natural order, he selected certain characters as diagnostic, but not necessarily universal, and constructed professedly artificial or only partly natural keys to his "natural" orders.

When Linnæus turned his attention to the classification of animals, we may believe that he followed the same principles. In this application of the principles gained in one subject to the data of another, we have a good example of the felicitous union of specifically distinct ideas to produce a line of ideas that are new and very fertile.

### The Relation of Linnæus to his Successors.

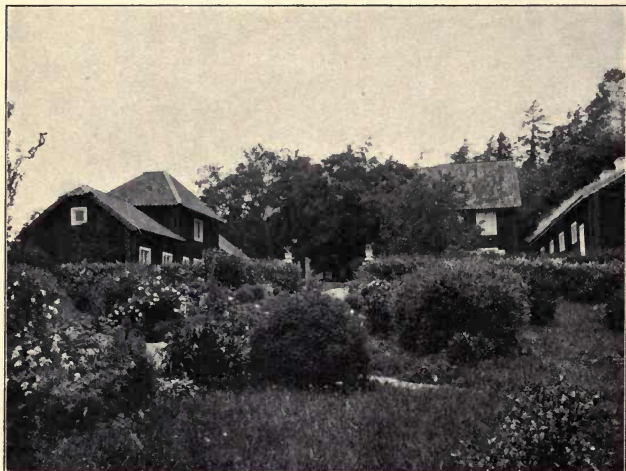
Linnæus inherited from Ray and from the scholastic system the dogma of the separate creation and objective reality of species, which became

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<sup>1</sup> *Op. cit.*, pp. 319-325.







Courtesy N.Y. Botan. Garden.

W. A. Murrill, Photo.

FIG. 1. HAMMARBY, THE COUNTRY HOME OF LINNÆUS NEAR UPSALA, SWEDEN.



Courtesy N.Y. Botan. Garden.

FIG. 2. TABLET PLACED ON THE LINNÆUS BRIDGE BY THE NEW YORK ACADEMY OF SCIENCES.

developed and strengthened in his hands as a result of his observations. His dictum was *species tot sunt diversæ quot diversæ formæ ab initio sunt creatæ*. The resemblances between members of a single species were hence held to be due to descent from an original pair, and the mutual infertility of different species to be the natural penalty of the effort to traverse the gaps established from the beginning.

This view was somewhat modified in later editions of the *Systema*, in which Linnæus held that "all the species of one genus constituted at first (that is at the Creation) one species, *ab initio unam constituerint speciem*; they were subsequently multiplied by hybrid generation that is by intercrossing with other species."<sup>1</sup>

The general relation of Linnæus to his successors may be summarized in a few words. The sixth epoch in the history of zoölogy extends from the latter part of the eighteenth to the middle of the nineteenth century, and may be called the Anatomical Epoch, because, through the labors of Cuvier and his great English pupil and successor, Richard Owen, the taxonomic studies of the Linnæan school were supplemented by the establishment and great development of the sciences of comparative anatomy and paleontology. In spite, however, of the improvement and expansion of classification, its bearing upon evolution was not generally perceived. Cuvier's researches in these sciences further extended the dogma of the fixity of species; but Owen, through his broader knowledge, gradually gave up the idea and became an evolutionist, although not a selectionist.

The seventh epoch, the Darwinian, in which happily we are living, has seen the overthrow of the traditional doctrine of the fixity of species, and has initiated the re-examination of all morphological phenomena in the light of the doctrine of evolution. These morphological facts are reflected more and more in our evolving classifications, which are the outgrowth of the Linnæan system, and which now aim to express, not only degrees of homological resemblances and differences, but also (secondarily) degrees of genetic kinship.

The great "lawgiver of natural history" is thus seen in his proper perspective in a few at least of the series of historical antecedents and consequents which intersected in him, inheriting, as he did on the one hand, the language and general methods of the past and the doctrine of special creation; inheriting on the other hand the new spirit and contributions of Vesalius, Cesalpino, Ray and many others, and building upon this the foundations of modern botany and zoölogy.

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<sup>1</sup> Osborn, H. F. From the Greeks to Darwin, p. 129.

At the close of the reading of Dr. Allen's address, recess was taken till two o'clock, p.m. During this time the Council entertained at luncheon at the Hermitage Hotel, near Bronx Park, the delegates of sister societies and invited guests. Afterward the special exhibits at the Botanical Museum were examined, and then was delivered the following address.

## LINNÆUS AND AMERICAN BOTANY.

By PER AXEL RYDBERG, PH. D.

*Mr. Chairman, Ladies and Gentlemen:*

I have been asked to make a short address to you on Linnæus and his relation to North American botany. That the selection fell on me was not because I was the most able one to deliver such an address, for there are



THE TWIN-FLOWER, LINNÆA BOREALIS

A plant especially beloved by Linnæus, and dedicated to him by Gronovius.

many abler men present, but simply because I was born in the same country as Linnæus. In fact, my grandfather came from the same province of Småland and even from a parish adjoining that of Stembrohult, in which my illustrious countryman was born.

In the early part of the seventeenth century there lived in Jonsboda,

Småland, Sweden, a farmer named Ingemar Svenson. He had three children, two sons and one daughter, the grandmother of Linnæus. On the Jonsboda farm stood a very large linden-tree, so old and with so many traditions that it was regarded by the people as a holy tree. Any damage done to this tree, it was claimed, would surely bring misfortune upon the head of the perpetrator. When the two sons began to study for the ministry, it was natural that they should think of this tree in selecting a family name. They called themselves Tiliander; *Tilia* is the Latin for the linden or bass-wood, and *andros* the Greek for man. It may not be amiss to state that at that time the common people of Sweden did not have any family names, and this is true to a certain extent even to-day. A man was known by his given name, the given name of his father with the word son appended, and the place where he lived. The farmer mentioned above was known as Ingemar Svenson from Jonsboda. His father's name was Sven Carlson, and that of his grandfather, Carl Johnson. The names of his two sons would have been Carl and Sven Ingemarson, had they remained in the peasant class, instead of Carl and Sven Tiliander.

The daughter married a farmer, Ingemar Bengtson; and her son's name was Nils Ingemarson, until he entered the "gymnasium." He also was born in Jonsboda, and, when selecting a name, he also naturally turned to the same old linden-tree as his maternal uncles had done. He called himself Linnæus. It is remarkable that two of his father's maternal grand-uncles also bore another Latin form of the same name, viz., Lindelius. Some claim that even this name was derived from the same old linden-tree, but this is scarcely in accordance with the facts. More likely it traces its origin from the Linden Farm in Dannäs Parish, where their ancestors lived.

But what has this genealogy to do with Linnæus's relation to North American botany? Perhaps nothing directly, but indirectly a great deal; for the circumstances and surroundings under which a man is born and reared to a certain extent make the man. In his younger days, Sven Tiliander was the house-chaplain of Field-Marshal and Admiral-Viscount Henrik Horn, who was for many years Governor of Bremen and Verden, two cities with territory in Germany acquired by Sweden through the Thirty-years War. During his stay in Germany, Tiliander learned to know and love botany and horticulture, and established around Viscount Horn's residence in Bremen a garden which was remarkable for that period. When both returned to Sweden, Tiliander brought with him the choicest plants from this garden and planted them around the parsonage of Pjetteryd Parish, of which he had been appointed rector. Here at Pjetteryd, Nils Linnæus spent most of his youth, studying in company with his uncle's sons. Later, both as curate at Råshult and as rector at Stenbrohult, he



surrounded the parsonages with gardens in which he grew many rare and interesting plants. In the midst of these, Carl Linnæus, the famous botanist, was born and reared. Later, while a student at the university, he spent a summer vacation at home in 1732, and made a list of the plants in his father's garden. This list is still to be seen in the Academy of Science at Stockholm. Although defective, the first four classes being unrepresented, it enumerates 224 species. Of these, many were at that time very rare in cultivation. Professor Theodore Fries in his biography of Linnæus enumerates 36 of the rarest of these. Among them we notice six American plants, viz., *Rhus Toxicodendron*, the poison oak, *Mirabilis Jalapa*, four-o'clock, *Asclepias syriaca*, milkweed, *Phytolacca decandra*, pokeweed, *Antennaria* (now *Anaphalis*) *margaritacea*, pearly everlasting, and *Solanum tuberosum*, the potato. It may be remarked that the cultivation of potatoes was introduced into Sweden about twenty years later. We see from this that Linnæus had learned to know some American plants even in his early childhood.

Carl Linnæus was born the 13th of May, O.S., 1707, at Råshult, an annex to the parish of Stenbrohult. His father was the curate there; but two years later, at the death of his father-in-law, Samuel Broderson, he became rector and moved to Stenbrohult. In the fall of 1714, Carl Linnæus entered the school of Wexiö, and graduated from the "gymnasium" in 1727. His parents, especially his mother, wanted him to study for the ministry; but he had no love for theology, nor for metaphysics, nor the classics. He learned Latin tolerably, however, because that language helped him to study the natural sciences. He decided to study medicine, and entered with that view the University of Lund, which was nearest his home, but remained there only one year, learning that there were better facilities at Upsala. At the latter place he soon became acquainted with Professors Rudbeck and Celsius, two of the most prominent scientists of that time, and was allowed to use their libraries. The former, who had many duties to perform, soon asked Linnæus to give for him the public lectures in botany. The income from these gave Linnæus means to support himself, and linked him closer to his favorite study. He became acquainted with practically all the plants of the gardens and fields of the whole region around Upsala, and learned all the scientific names given in the books at his disposal.

The latter was not an easy matter when we take into consideration the form of scientific names at that period. For example, the most approved name of the common blue-grass that adorns our lawns was, "*Gramen pratense paniculatum majus, latiore folio, Poa Theophrasti*." Other names of the same grass were, "*Gramen vulgo cognitum*," "*Gramen pratense*

*majus vulgatus*," and "*Gramen alterum et vulgare*." In the first publication by Linnæus, it appears as "*Poa spiculis ovatis compressis muticis*." I think that Linnæus and his contemporaries had much more cause than we to exclaim, "Those horrible Latin names!" To us the same plant is known as *Poa pratensis* L., the name adopted by Linnæus in his "*Species Plantarum*."

The lectures given by Linnæus for Professor Rudbeck became very popular. This was especially the case after his return from his Lapland journey. Some persons, especially Dr. Nils Rosen, became jealous of his success, and induced the university faculty to pass a resolution by which no one who had not taken the corresponding degree was permitted to give university lectures. Linnæus had not yet received his doctor's degree, and hence was debarred. As Holland was offering at that time excellent facilities both in medicine and in botany, and as living expenses were lower there than elsewhere, Linnæus decided to visit that country and take his examinations there. He received his doctor's diploma at Harderwijk, and afterwards went to Leyden, where he became acquainted with three of the greatest botanists of the time, Boerhaave, Burmann and Gronovius. George Clifford, the wealthy burgomaster of Amsterdam and president of the East India Company, was a great lover of plants, and had a splendid botanical garden at Hartecamp as well as a rich library and herbarium. On the recommendation of Boerhaave, Linnæus became Clifford's physician, and curator of his collections and garden. Here he lived in luxury, beloved as a son.

Clifford furnished Linnæus with means to publish five of his first books, "*Systema Naturæ*," "*Fundamenta Botanica*," "*Bibliotheca Botanica*," "*Genera Plantarum*" and "*Flora Lapponica*," the manuscript of which he had brought with him from Sweden. In the first of these, Linnæus presents his system of classification. He divides Nature into three kingdoms,—the mineral, vegetable and animal. In the vegetable kingdom he brings out an altogether new classification, based upon the sexual organs of plants. He divides the kingdom into 24 classes, the first 23 containing the phanerogams, and the last the cryptogams. In the first 11 classes are included plants which have from 1 to 12 free and practically equal stamens; in the 12th and the 13th, plants with many stamens; in the 14th and 15th, plants with 4 and 6 stamens respectively, of which 2 are decidedly shorter. In the 16th, 17th and 18th classes the stamens are united by their filaments, in the 19th they are united by their anthers, and in the 20th they are adnate to the pistil. In the 21st and 22d the flowers are unisexual, i.e., the stamens and pistils are in different flowers (on the same individual in the 21st and on different individuals in the 22d); and the plants of the 23d class have both

unisexual and bisexual flowers. The classes were divided into orders. In the first 13 classes the orders were determined by the number of the pistils; in the 14th and 15th, by the fruit; and in the 16th to 18th and 20th to 23d, by the number and distinctness or union of the stamens. The classification of the 19th class is too complex to enter into here. The 24th class was divided into four orders: Filices, Musci, Algæ and Fungi.

This system of classification is purely artificial. Linnæus himself regarded it only as temporary, and expected that it would soon be supplanted by a more rational one, based on natural relationship. The Linnæan system served its purpose, however. It became a means by which it was possible to tabulate every known genus of plants. Before this time there had been no systems at all, or such crude ones as we find even to-day in some popular flower-books, where the plants are classified by the color of their flowers. If the natural systems of DeCandolle, Bentham and Hooker, and Engler and Prantl, are too complicated for popular books, why not go back to the simple system of Linnæus? It would at least give a good insight into the structure of the flower instead of the mere color.

In his "Genera Plantarum," Linnæus applied this system to all known genera of plants, and gave each of them a concise and plain description.

Cliffort had many American plants in his garden, but he sent Linnæus to England to visit Sir Hans Sloane, Professor Dillenius and Philip Miller, in order to secure American plants grown by them. Both Sloane and Dillenius treated Linnæus at first with coolness, because he "confounded botany." On his farewell visit to Dillenius, Linnæus politely asked him what he meant by "confounding botany." Dillenius took from the library the first few pages of Linnæus's own "Genera Plantarum," and showed him where there was written at numerous places "NB." Dillenius stated that all the genera so marked were wrongly described. The first example he pointed out, if I am not mistaken, was *Canna*, placed by Linnæus in his first class, which contains plants with but one stamen. Botanists before this time had described it as having three stamens. To settle the dispute they went out into the garden, and the living plant showed that Linnæus was correct. Dillenius then retained Linnæus for several days, and found that the older botanists in most cases were at fault and the young Swede correct. From being an opponent, he became a friend, of Linnæus and let him have all the plants he wanted.

After his return to Holland, Linnæus continued his work in Cliffort's garden with renewed zeal, and completed his "Hortus Cliffortianus," a large folio, in which are enumerated and described all the plants found in Cliffort's collections, together with synonyms and citations of nearly all botanical works then in existence. In preparing this work he became

thoroughly acquainted with almost all the literature referring to American botany, such as Morison's "Plantarum Historia," Plukenett's "Almagestrum Botanicum" and "Phytographia," Petiver's "Gazophylacium," Sloane's "Jamaica," Plumier's "Plantarum Americanarum Genera," "Plantarum Americanarum Fasciculus Primus" and "Filicetum Americanum," Catesby's "Historia Naturalis," and, later, Cornuti's "Canadensium Plantarum Historia."

After completing the "Hortus Cliffortianus," Linnæus returned to Leyden, where he spent some time helping Gronovius with the editing of his "Flora Virginica," based on a large collection of plants collected by Clayton. Here again he came in contact with American plants.

Linnæus then returned to Sweden and became a practicing physician. He was soon appointed professor of medicine at Upsala, but by common agreement he exchanged chairs with Rosen, who held the professorship of botany. He now began work upon the most important book of his life, his "Species Plantarum." In this he tried to include a short description of every known species of plant, together with the most important synonyms and citations. In this book the Linnæan binomial system of nomenclature was used for the first time. Linnæus was not the first to give plants names, nor was he the first to name genera. Many Latin plant-names had come down from antiquity, while others had been proposed by his predecessors. Men like Tournefort and Micheli had in some cases clearer ideas of genera than Linnæus himself. Neither was Linnæus the first one to use binomials. In Cornuti's work on Canadian plants, for example, we find almost as many binomials as polynomials; but it is doubtful if Linnæus had seen Cornuti's book when he first wrote his "Species Plantarum." He does not cite it in the first edition, but does so in the second. Linnæus was, however, the first one to use binomials systematically and consistently. Before his time, botanists had recognized genera, and applied to them Latin nouns as names. In order to designate species, they added to these nouns adjective descriptive phrases. These consisted sometimes of a single adjective, as in *Quercus alba*, the white oak, but more often of a long string of adjectives and adjective modifiers, as in the case of the blue-grass mentioned above. The specific name had hitherto been merely a description modifying the generic name; from this time it became really a name, although a single adjective in form. An illustration of the pre-Linnæan form of plant-names might be had if, instead of "Grace Darling," one should say, "Mr. Darling's beautiful, slender, graceful, blue-eyed girl with long golden curls and rosy cheeks." "Grace" is just as descriptive of the girl as this whole string of adjectives. It may be that "Grace" is not always applicable to the person to whom the name is applied; but this is also often the case with many specific plant-



names. *Asclepias syriaca* and *Rumex Brittanica* are American plants, and *Rubus deliciosus* is one of the least delicious of the raspberry tribe. This invention and strict application of binomial names could not but cause a revolution in botany. Since the appearance of "Species Plantarum" in 1753, it has been possible to pigeon-hole not only genera, but also species, of plants.

Before this useful-book was printed, Linnæus had become better acquainted with North American plants, and in another way. Baron Bjelke, the vice-president of the Court of Appeals of Finland, had proposed to the Royal Academy of Sciences at Stockholm to send an able man to Iceland and Siberia, countries partly in the same latitude as Sweden, "to make observations, and such collections of seeds and plants as would improve the Swedish husbandry, gardening, manufactures, arts and sciences." Dr. Linnæus suggested North America instead, and recommended one of his pupils, Professor Pehr Kalm of Abo, for the proposed expedition. Kalm spent two years in North America, traveling through Pennsylvania, New Jersey, New York and Canada, and making large collections of seeds and plants, which were preserved as living or dried specimens, or as alcoholic material. During his stay at Raccoon, N.J., he discovered our mountain-laurel. The Swedes of Raccoon called it spoon-tree, because the Indians made spoons from its hard wood. Kalm adds in his journal, about this tree, "The English call this tree a laurel, because its leaves resemble those of the *Laurocerasus*. Linnæus, conformably to the peculiar friendship and goodness which he has honored me with, has pleased to call this tree *Kalmia foliis ovalis, corymbis terminalibus*, or *Kalmia latifolia*." Here Linnæus himself gave an illustration of both the pre-Linnæan and the post-Linnæan nomenclature. Kalm became acquainted with several of the naturalists of this country, C. Colden and his daughter Jane, Bartram and Clayton, and through Kalm a correspondence was established between them and Linnæus. Linnæus also corresponded with John Ellis, who resided in the West Indies, and Dr. Gardiner, who botanized in Carolina and Florida. Later he bought a set of plants collected by Patrick Browne in Jamaica, and received a part of the collections made by Jacquin in the West Indies.

When the second edition of the "Species Plantarum" appeared, in 1762, Linnæus knew and had described nearly 1000 plants indigenous to the United States and Canada. Besides these, he described about 1000 more, natives of the West Indies, Mexico and Central America, and 400 or 500 South American plants. His knowledge of American plants was small compared with what he knew of plants of the Old World. "Codex Linnæanus," which enumerates all plants named by Linnæus, contains not fewer than 8551 species.

Linnæus died Jan. 10, 1778, honored and esteemed by all. Some of his work will doubtless live as long as botany is studied by man.

We see from the preceding account that we may consider Linnæus one of our American botanists. Even the little plant which Gronovius dedicated to the Father of Botany, the twin-flower of our woods, with its exquisite perfume and its dainty pink flowers, belongs to a genus essentially North American. The genus *Linnæa* contains four forms, all closely related. One of these, the original *Linnæa borealis*, is confined to the mountain regions of northern and central Europe. Linnæus discovered it on his Lapland journey, and it was then considered a very rare plant. Now it seems to be more widely distributed than it was at the time of Linnæus. Perhaps it is of American origin, and has become modified since it transplanted itself on the other side of the ocean. The other three forms are North American. *Linnæa americana* Forbes, which has usually been confounded with its European cousin, is common in the woods from Labrador to Alaska, and extends in the Rocky Mountains as far south as New Mexico. *L. longiflora* (Torr.) Howell, is found in the mountains from northern California to Alaska. The fourth form is, as far as I know, undescribed and unnamed. It is with great pleasure that I here propose the following name and description for this species.

***Linnæa serpyllifolia* sp. nov.**

A delicate plant with long creeping stems, 1–4 dm. long, sparingly hirsute; petioles 2–3 mm. long, ciliate; blades broadly oval or round-ovate, 5–8 mm. long, minutely crenulate, obtuse, sparingly hirsute, more or less coriaceous and shining, slightly paler beneath; peduncles 3–5 cm. long, sparingly pubescent and more or less glandular above, 2-flowered; bracts 2–3 mm. long, linear or lance-linear, obtuse; pedicels 5–8 mm. long, glandular-pubescent; hypanthium subglobose, in flower slightly over 1 mm. long, glandular-puberulent, purplish; calyx-lobes 2–2.5 mm. long, linear-subulate; corolla pink, open-funnelform with a very short tube, decidedly oblique, about 6 mm. long and 5 mm. wide.

This species differs from *L. borealis* and *L. americana* in the very narrow and almost glabrous calyx-lobes. In this respect, it agrees with *L. longiflora*; but it is distinguished from that species by the differently shaped corolla and by the leaves, which are broadest at or below the middle, instead of above it. It differs from all three in the smaller size of the flower and of the leaves, and in the indistinct toothings of the latter.

Alaska: Cape Nome, 1900, *F. E. Blaisdell* (Type in herb. N.Y. Bot. Gard.); Kotzebue Sound, *Arnott*.

Apparently the same plant has also been collected on the Island of Sachalin by F. Schmidt, but his specimens lack flowers.

After Dr. Rydberg's address, Professor H. H. Rusby gave an exhibition of selected lantern slides of flowers of North American plants known to Linnæus, and then Dr. W. A. Murrill led the party southward from the Museum building, through the Garden, to the Linnæus Bridge, pointing out on the way the following characteristic American trees known to Linnæus.

Tulip-tree	White ash	White elm
Sweet-gum	Sugarberry	Red oak
Red maple	Flowering dogwood	White oak
Red cedar	Sassafras	Hemlock
Sweet birch	Buttonwood	Chestnut-oak
White pine	Butternut	American linden

At the Linnæus Bridge over the Bronx River, on Pelham Parkway, Professor N. L. Britton, President of the New York Academy of Sciences, unveiled the bronze tablet commemorative of Linnæus which had been placed there by the Academy with the consent of the Department of Parks of the city of New York, and made the following address.

#### ADDRESS BY THE PRESIDENT OF THE ACADEMY.

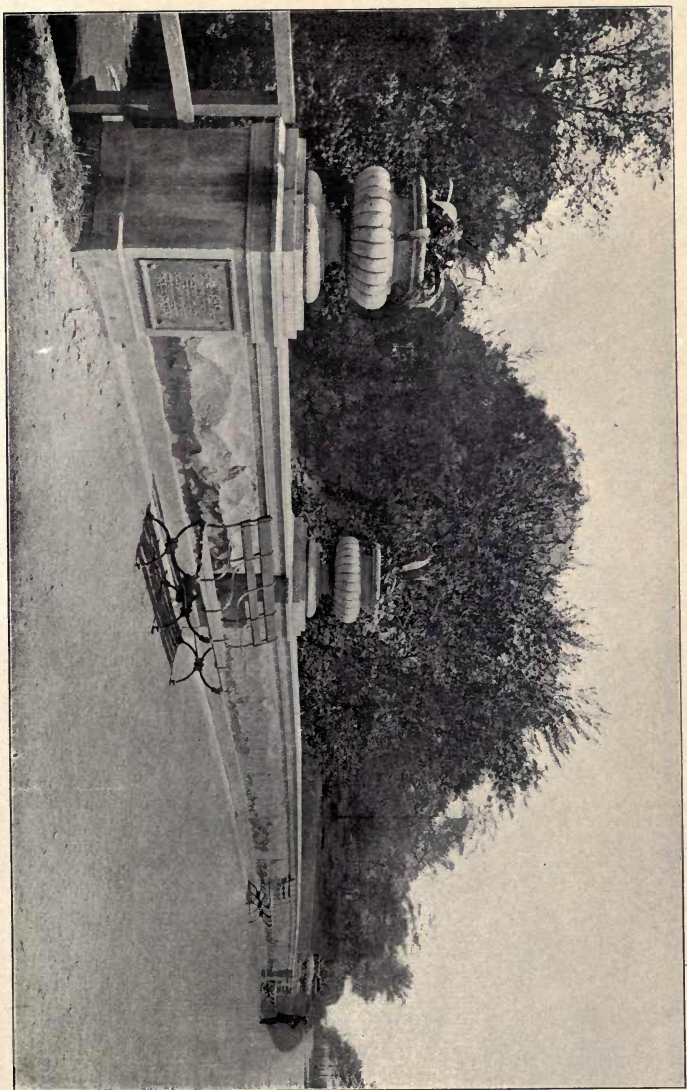
N. L. BRITTON, PH. D.

*Director-in-chief, New York Botanical Garden.*

The recognition of the work of famous men is one of the happiest duties of mankind. It stimulates our endeavors and encourages us to make efforts which we would probably not make without their examples before us.

To-day we do homage to a distinguished man of science, and the unanimity with which the scientific societies and institutions of the city of New York join in this tribute is in itself evidence of the value which is placed upon his contributions to natural history.

Science has made great progress during the two centuries which have elapsed since the birth of Linnæus. Theories have in large part given place to ascertained facts, or have been replaced by other theories based on more accurate knowledge of natural objects and of natural phenomena. The contributions of science to the welfare, comfort and happiness of mankind, have made present human life widely different from that of two







hundred years ago; and this amelioration of our condition, and the more general diffusion of knowledge, have been accompanied by a vast improvement in morality.

The ceremonies of to-day are worthy of the great naturalist whose birth they commemorate. Societies and institutions all over the world join with us in honoring him, and are represented here by delegates, or have transmitted documents expressing their appreciation of his life and labors. The public natural science institutions of New York have come to take leading parts in the subjects they teach and illustrate. Public and private philanthropy have developed them with a rapidity almost phenomenal, for they are all yet in their infancy and on a scale commensurate with the dignity of the metropolis of America. The cordial co-operation of a municipality with public-spirited citizens to build and maintain such institutions for the welfare of the people and of science, finds here in New York its maximum evolution, which has as yet, however, by no means reached its complete development or its maximum usefulness. What will be said of their position and importance when after fifty years the New York Historical Society opens the tablet which we now place upon this bridge? And what discoveries will science have made for the benefit of the human race during this next fifty years?

The selection of this bridge, recently constructed by the Park Department, as a permanent memorial of Linnæus, is most appropriate. It is situated just outside the New York Zoölogical Park, with the New York Botanical Garden a short distance to the north, being thus between the two institutions which teach the subjects on which the fame of Linnæus chiefly rests. The suggestion that it be known hereafter as the Linnæan Bridge came from the Director of the American Museum of Natural History.

On behalf of the New York Academy of Sciences I now unveil this tablet, and present it to the city of New York, there having been placed in it copies of to-day's program and other documents befitting the occasion.

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After Wennerberg's song, rendered by the American Union of Swedish Singers, "Hear us, Svea," Hon. Joseph I. Berry, Commissioner of Parks of the Borough of the Bronx, in a few fitting words accepted the tablet on behalf of the city of New York, and then delivered the key of the box within the tablet to the New York Historical Society, for preservation till May 23, 1957. These ceremonies were followed by the singing, by the chorus, of Lindblad's "Battle Hymn," and then the audience listened to the following two addresses.

ADDRESS BY THE PRESIDENT OF THE AMERICAN SCENIC  
AND HISTORIC PRESERVATION SOCIETY.

GEORGE F. KUNZ, PH. D.

Linnaeus was a great scientist, and the conquests of science have done more to advance the world than wars, which science may yet render impossible. It was thirty years of scientific research in Germany that gave us artificial indigo. It was pure scientific research that led Moissan, Cowles and Acheson to discover independently an abrasive substance of a hardness between the diamond and the sapphire; and then Moissan by scientific deduction worked out the genesis of the hardest and most fearless of gems, which, though obtained only in the form of powder, was still the diamond. Within the past quarter of a century we have seen air, oxygen and hydrogen liquefied, giving us temperatures absolutely unknown in nature before, and also the electric furnace, giving an extreme heat such as has perhaps never existed, unless it be on the surface of the sun.

Jade, the Chinese stone, has been known in China for more than a thousand years. Some believe that it was known to a prehistoric race the existence of which was almost unknown to the Chinese, and whose only records extant are found as we find the evidences left of the mound-builders, who passed away before the advent of the white man in North America. It was not until 1866 that Damour, a scientist, separated jade into two distinct minerals, nephrite and jadeite; and one of those into two varieties, jadeite and chloromelanite — facts unknown to the Chinese, though they apparently knew and understood every tiny fragment they had ever seen of this mineral. It was the scientist who took three red stones belonging to the King of Burmah or to the Emperor of China, and proved to him that one was a ruby, one was a spinel, and the third a tourmaline, and not all rubies, as they had been regarded for a century or more previously.

Moses was the first great systematizer, and his original assemblage of the people in tens, hundreds and thousands, is carried out in the military systems of to-day, and is again reflected in our own and in the monetary systems of many of the European nations, and more especially in that indispensable and scientific international system of weights and measures, the metric system. It was Alexander who conquered the eastern world, bringing back with him much refinement, and possibly also the valuable and industrious silkworm; and it was he also who discovered that the carrying powers of his camels were doubled if he employed a gold medium of exchange instead of silver. Cæsar, in his attempt to conquer the world, did much

toward the dissemination of education and civilization, from which Rome greatly benefited.

Napoleon upturned and readjusted the treasures of a number of kingdoms, duchies, cloisters and churches in Europe; and, even though his *régime* was attended by frightful loss of life, marked and permanent improvement has followed it. But it was La Sage, a scientist, who compiled a great work for Napoleon, from which he learned what noble families had lived in all times, and what campaigns had been fought by the various conquerors; and it was a thorough study of La Sage's work that had much to do with giving Napoleon an idea as to what worlds others had conquered, and what parts of this world were left for him to subdue.

It may not be generally known that it was one of our New York scientists, Dr. Melvil Dewey, who introduced the card catalogue system of cataloguing books, which led to the present system of keeping books by the loose-leaf system.

It would be easy to mention many who have materially assisted in the advancement and organization of the multifarious affairs of mankind; but the other and lower creations of nature outnumbered mankind many thousand times, and the co-ordination of scientific nomenclature covering this vast domain is due to the great Carl von Linné. Until his time, an animal was known as a deer in English, a Hirsh in German, a cerf in French, and by fifty other names in as many different languages. By applying two or three words as a name to every creature that flies in the heavens above, that dwells in the earth beneath or in the waters under the earth, he made it possible for the scientist, whether at the Cape of Good Hope, in Greenland, in New York, or in the Sandwich Islands, to know not only just what living form was referred to, but also to understand immediately to just what genus, class, species or variety, this living organism belongs.

The Linnæan system has also greatly aided scientific classification in natural history, which, in connection with medicine, has given us the connecting link in the science of biology and bacteriology. The Linnæan system compares with the natural history of to-day as alchemy does with chemistry, as astrology and fortune-telling with astronomy and medicine of the present time.

It is strange that, as well-planned and admirable and successful as the Linnæan system is when applied to the nomenclature of animate objects, it was absolutely rejected by the then mineralogists and chemists, as the chemical equivalents and the structure are frequently better expressed by a single term than they would be by a binominal system.

Had a Linnæan system existed when Adam and Eve were in the Garden of Eden, there would be no dispute to-day as to whether the "apple" which



caused their expulsion from the Garden was the identical kind of apple that has caused so many boys to be driven from gardens and orchards wherein they trespass to-day, or whether it was a pomegranate, an orange, a lemon, or some other fruit of which we have no knowledge. If Noah had known a Linnæan system when he took his animals into the ark, and had so named them, how helpful that would be to us to-day! There would not be the doubt in the minds of the few who still maintain that evidences of the flood are to be found in fossil remains, since these would belong to those animals that were destroyed at the time of the great flood.

We have recorded a history of the past, to-day we have heard much of Linnæus and his time: let us speak now of the present. For a quarter of a century it has been our pleasure to know one of the most ardent disciples of Linnæus that has lived in our land; and had it not been for his untiring zeal, his keen judgment, his constant application, it is a question whether we would be assembled to-day to dedicate this bridge to the memory of Linnæus. We remember twenty-five years ago when he first appeared before the Academy of Sciences, and it is almost that long ago that he first suggested a botanical garden. The Botanical Garden undoubtedly influenced the Zoölogical Park, and each successive scientific institution has strengthened the others, so that, as science stands united to-day, New York is perhaps and will long remain one of the leading scientific cities in the country, if not the foremost; and no one more than our esteemed President of the New York Academy of Sciences, and Director of the Botanical Garden, Dr. N. L. Britton, has assisted in the unification and the advancement of our greatest Academy of Sciences. Dr. Britton was the pioneer with the Botanical Garden. Professor Henry Fairfield Osborn, another disciple of Linnæus, was the pioneer in the Zoölogical Park, which has been so ably conducted and carried on through that indefatigable worker, Dr. W. T. Hornaday, who brought to his task a world-wide experience of animals, their habitats and their characters. Therefore it seems eminently fitting that this bridge should form a connecting link between these two Siamese Twins, as it were, of botany and zoölogy in the United States.

It is science that gives us this well-ordered Bronx Botanical Garden, which, beautiful as it is, is a living botanical exposition, made possible through the organization of Linnæus, the energy, industry and intelligence of a Britton, the generosity of the founders and its trustees and the encouragement of our great city of New York.

Although historic sites and buildings may be marked with tablets or with monuments of stones, yet it was Nero who removed the Greek inscription, and placed his own, over the architrave of the Parthenon. In 1881 we were surprised to see some stone-cutters removing from within the laurel wreaths

on the arches of the bridge across the River Seine the raised letter N placed there by Napoleon III, and a few days later to see them incise the letters R. F. (*République Française*) where the N had formerly been.

The value of preserving historic sites or commemorating historic events by indestructible means, such as medals or engraving in stone or metal, has always served as a great benefit to those who were to follow. A simple tablet on the summit of the Jura Mountains tells one when, where and how the great Napoleon crossed those mountains. A tablet in Russia relates that Napoleon entered Russia at this point with seven hundred and twenty thousand men, and less than a year later returned with an army of only a hundred and twenty thousand, having lost six hundred thousand.

The use of metal and baked tiles for the perpetuation of portraits and historic events forms one of the most feasible and enduring means. It is due to the coins and the medals that have been struck since about the seventh century B.C. that we have an almost unbroken line, for the past twenty-four centuries, of portraits and history; and to Assyrian baked tablets, that we have some four thousand years of history recorded.

There should be a most stringent law, a national law, rigidly enforced, for the punishment of any vandal who destroys, either wantonly or for the purpose of loot, any monument, as, for instance, the André Monument on the banks of the Hudson and the tablet marking the Slocum disaster.

It is the honor and pleasure of the American Scenic and Historic Preservation Society to take part in this historic event, and it is its official function to describe accurately the event in its Annual Report edited by our able Secretary, Edward Hagaman Hall, and published by order of the Legislature of this State. So the record of this event will appear in series with that of the dedication of Stony Point as a park; the re-dedication of the André Monument; the preservation of the Palisades; the McGowan's Pass tablet; more recently the acceptance of the gift of three miles of one of the most beautiful ravines on the continent, containing three fine waterfalls, presented to our State by the Honorable William Pryor Letchworth, for which the Society is to act as a Trustee; and the State's acquisition of Watkins Glen.

ADDRESS BY THE PRESIDENT OF THE UNITED SWEDISH  
SOCIETIES OF NEW YORK.

EMIL F. JOHNSON.

I do not intend to encroach upon your time by attempting to make a long speech, but I consider it my duty as president of the United Swedish Societies to express to you, Mr. President, and to the members of the New York Academy of Sciences, our gratitude for the opportunity you have given us to take part in honoring the memory of our distinguished countryman Linnæus, whom we are used to call the "Flower King of the North." To be sure, our participation in this celebration is limited to the assistance given by our singing societies and to the presence of a goodly number of our people in the park. The Swedish minister to Washington, Mr. Lagercrantz, is also with us, and I take this opportunity to convey to you, Your Excellency, our appreciation of the interest you have shown by coming to New York to-day. Our consul and vice-consul are also with us.

I saw a statement in a paper a few days ago to the effect that Swedes in New York have presented this beautiful bridge to the city. I only wish that such were the case; but unfortunately we are only about fifty thousand strong in this neighborhood. Such a gift might well be possible out West, where, as you know, most of the Swedish immigrants settle, but not here. Indeed, there are parts of the West and Northwest, where for miles upon miles you will find Swedish settlements almost exclusively, and all in prosperous condition. In Chicago the Swedes have even erected a statue to the memory of Linnæus, a duplicate of one erected in Stockholm just twenty years ago to-day. I remember the date well, because I took part in the celebration, being a student in Stockholm at the time.

It is a great satisfaction to us Swedes, that Linnæus, whose memory is to-day honored all over the globe, was a man of peace. Every one has heard of our Gustavus Adolphus and Charles XII, not to mention the old vikings; but our great scientific men — such as Linnæus, Berzelius, Scheele, Celsius, Edlund, Rudbeck and others — are known only to a select few. Even John Ericsson the great engineer, whose statue has been erected in Battery Park by the city of New York, is remembered and honored only on account of his ship of war, the "Monitor." The fact that he invented the fire-engine, the propeller, the solar engine, the hot-air engine and other wonderful machinery, is well-nigh forgotten, though we have in the city to-day about fifteen thousand pumping engines run with heated air on Ericsson's principles, and the solar engine is being used more and more in California.

His work was work of peace of the very highest character, and to be commended as such.

There is one part of Linnæus's life-work which may not have been referred to to-day, and that is his work as an archeologist. While pursuing his studies in botany and zoölogy, Linnæus naturally traveled a great deal around the country; in doing this, he made careful notes of the mounds, runestones and other marks left by the ancient inhabitants, which marks are very abundant all over Sweden. In fact, his writings on this subject have formed a basis for the very interesting archeology of Sweden. Personally, I have derived much more pleasure from this part of Linnæus's writings than I have from the others, although once upon a time I did know the Latin names of a few hundred plants. Once more I thank you, Mr. President, in behalf of the Swedes of New York, and I will close by proposing a cheer for the memory of Linnæus, and will ask the singers to assist me with a genuine Swedish hurrah.

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At the close of the exercises at the Bridge, many people, in spite of the lateness of the hour, walked through the New York Zoölogical Park to note American animals known to Linnæus. The party was under the guidance of Director Hornaday and Messrs. Ditmars, Beebe and Blair.

In the evening the literary exercises of the day were continued at the Museum of the Brooklyn Institute of Arts and Sciences, Eastern Parkway, Brooklyn. After brief opening remarks by Mr. F. A. Lucas, Director of the Museum, the following address was read.

## A SKETCH OF THE LIFE OF CARL VON LINNÉ.

By EDWARD L. MORRIS.

There is something of human interest in the personal side of any one's life, if we but know an avenue of approach. Such avenues are closed to most of us for most lives. The public careers of great men are matters of recorded or current history. The professional activities and writing of men of science are open to those interested along similar lines; but often there is little opportunity to know the personal and characteristic things which are the real foundation and basis of success among men.

Our presiding officer has elsewhere said, "In some ways the career of Linnæus reminds one of a good old-fashioned fairy story in which the hero continually is being provided for. Time after time, Linnæus was taken up



by some man of wealth who practically supported him and gave him opportunities for study and research.

"Either genius was rarer in those days than now, or else it received more substantial recognition."

In 1706, Nils Linnæus, a Swedish pastor, and his bride Christina, began their home life in his parish in Råshult in Småland in southern Sweden. About their cottage he had planted a garden of flowers according to a taste developed while living with an uncle. In this garden the young bride took special delight, only to grieve sorely at the effects of the heavy winter frosts, but reacting to the hope and anticipation of the awakening of spring. Here were more than four hundred species of exotic plants. For such a latitude and for such a period of the world's history, this was a most unusual collection.

In the midst of the spring advent of the flowers, in May, 1707, there was born a son in the home of the parish leader. He was baptized "Carl." To-day we celebrate, in honor and praise, the birth of *Carl Linnæus*.

The following year, the family moved to Stenbrohult, to which were also removed most of the plants from the garden at Råshult.

As soon as the boy Carl could walk, he daily visited the new garden with his father, where he was the more attracted to the flowers because in his babyhood the parents had often attracted his attention by many bright blossoms. A little later he had a bed for his own flowers, which he chose from the main garden. Later still, he was given a plot for his own garden beside his father's. At four years of age, after a visit to a country fair, he so persisted in asking questions that he practically knew all his father could tell him,—the Swedish names and the uses of the native plants.

Typically, his mother delighted in the boy's absorption in the flowers (she was fond of them too), besides, this often kept the boy occupied for hours,—an important item in the daily program of the young housekeeping mother.

Boylike, oftener than not Carl forgot the answers to his questions. His father noticed this and called the habit mischievous, and refused to answer further questions till the boy promised to remember what was told him. This parental training became of the highest value to the future Linnæus.

Many of the relatives of Nils Linnæus were ordained to the service of the church. It was in the wife's heart to have their son be the same. But he was averse to all reading not related to natural history or more particularly to botany. His chief activity was to wander over the fields and through the woods, bring home every new species he found, plant some, and dry and preserve others. With these he brought in several weeds, which caused no end of trouble to his father, as they spread to the beds of

exotic plants. He became so proficient in his knowledge of the local plants that the neighbors all called him "the little Botanikus."

The story goes, that one day his mother found that he had even appropriated her much-treasured Bible in which to press some new-found flowers, and she began gently rating him for this.

"Dear child," she said, "you must not put herbs and flowers in my beautiful book. It would be quite a sin to spoil the Holy Bible."

"Pray forgive me, mother! But these are the most beautiful flowers I have ever seen, so I thought I would preserve them best of all, for I have heard both you and father say that the Bible is the Book of Life; and surely, if I put the flowers between its leaves, they will retain their color, the Bible keeping them alive forever."

"Child, when we call the Bible the Book of Life, we mean by that, not the life we see before us, but the spiritual growth of our souls, for every thought we think is a flower culled in the garden of our soul. There, as on earth, grow many various plants, some of wondrous beauty, and others stained with sin. But every time we humbly read in the Sacred Writ, a seed is sown in our heart, which some day will bloom, and bear holy fruit."

"How beautifully you talk, mother!"

"Well, you must diligently read your Bible, and in your heart will grow the seed of goodness and humility; but I fear"—

"What do you fear, mother?"

"I fear you love the fair flowers of the earth too much to care for the seeds that were watered with tears in the Garden of Gethsemane."

"O mother! no, I won't forget my Bible. But when I see a flower I think this way, 'Why does God make the cold, damp earth grow such lovely creatures with such beautiful colors? Why, if not to make us happy with the sight?' And then I almost fancy the flowers saying with their petal lips, 'Look at us, and think how kind and good is God.' O mother! every flower *must* have been a thought by God."

"Why, how you speak, child! Well, yes, you are right: it must be so."

When Carl was ten years old, after an unfortunate experience with a private tutor, he was sent to Wexiö, the capital of the diocese, to the grammar and higher grades. But here he failed because there was no teacher to lead and inspire him, but only those to drive. The boy mentally refused to be driven. Shortly he was put again under a tutor somewhat better than the former one; but in every subject except Nature he was considered a dunce.

In eight years his father, with sorrow in his heart, became convinced that Carl never would make a preacher. His mother, realizing this also, rued the love she had felt for the flowers and the interest on his part which she sadly had fostered, and with pique declared to her second son, Samuel, that he never should devote himself to so useless and wasteful a study as flowers.

In the words of another, "In this great distress, Pastor Linnæus called upon a friend Dr. Rothman, a physician of Wexiö who also taught physiology and botany in the school. His verdict, however, was, 'Well, a preacher Carl certainly never will be, but he might become a famous physician; and that profession will feed a man as well as the church. Your son is far advanced in natural history, and, without gainsaying, the foremost scholar in botany. If you will permit, I will take him into my house: he shall eat at my table *gratis*, and I will myself read with him during the year that remains before he can proceed to a university.' It need not be told how gladly father and son accepted this generous and well-timed offer."

Carl now removed to Dr. Rothman; and this learned gentleman with great discernment made it clear to his *protégé* of what great advantage, and how indispensable, were Latin and Greek for the study of medicine, botany and natural history.

The dead languages now became endowed with a living new interest, and instead of Justinus and Cicero, he studied with enthusiasm Pliny's "Natural History," performing thus a double study at the same time.

Dr. Rothman grew daily more and more attached to his pupil, who made amazing progress, and whose transcendent genius became more and more evident. He found great delight in guiding the young naturalist in his studies, but soon found, with little surprise and no envy, that his pupil far outstripped himself, for Linnæus could acquire no more from him.

Linnæus must enter the university, and nothing remained but to get the certificate from the Wexiö school. It was framed in very quaint and significant words; and it is curious that the trope of a tree, carried all through, should have been applied to the future of the professor of botany. It read as follows: "The youths in schools may be likened unto young saplings in a plantation, where it sometimes happens, although seldom, that young trees, despite the great care bestowed on them, will not improve by being engrafted, but continue like wild untrained stems, and when they are finally removed and transplanted, they change their wild nature, and become beautiful trees that bear excellent fruit. In which this respect, and no other, this youth is now promoted to the University, where, perhaps, he may come to a clime that will favor his further development." With this recommendation Carl Linnæus went to Lund, the southern university of Sweden, in 1727.

Here Linnæus boarded and lodged at the house of one Strobæus, who lectured in the university on natural history, geology, and botany. He was a man of acknowledged great learning in these sciences, and possessed a large private collection of stones, shell, birds and dried herbs. At this house also lived a German student of medicine, Koulas, eight years the senior of

Linnæus, who had the use of Strobæus's library, and who took upon himself secretly to lend his young friend what books he required in botany. The old mother of the learned host had observed that a light burned in the small hours of the night in Linnæus's room, and, fearing fire, told her son, who quietly one night went up to Linnæus's room to surprise the negligent fellow, but was himself surprised to find the student in the dead of night busily comparing the varying opinions of the greatest botanists of his time. This surprise won the admiration of the teacher and his affection, and he at once gave Linnæus the use of his library freely, and the keys to his collections, and, like Rothman, took the liveliest interest in the gigantic strides of progress.

In 1728, Linnæus changed to the University of Upsala to study under the renowned professors Roberg and Rudbeck. Here Linnæus suffered much from poverty, often having barely enough food to sustain life. At length, under dire necessity, he was about to start for home to his father, when he made a last visit to the garden of the university. Just then there was a rare exotic plant in bloom. Linnæus picked the flower, and was sharply reprimanded by a voice behind him. He explained that it was for a memento of the place, which he was now obliged to leave permanently. This aroused the interest and question of the dean, as it proved, — Celsius, senior. A result of this incident was, that Celsius saved Linnæus to science then and there by taking him to his own house, giving him new and large opportunities at the university, tiding over the time of distress, and procuring for him opportunities as private tutor to some of the students below him.

Here Linnæus brought out his little thesis developing his sexual system of grouping plants. From now on, Linnæus had a constant chain of promotions, spiced, disagreeably now and then, by jealousies wrought against him, but consisting of the delights of extensive, dangerous and economic travels, new positions of teaching and lecturing at home and abroad, and finally the full chair of botany at the University of Upsala.

His greatest and ultimate joy was in the knowledge that his system of plant relationships became, before his death, the commonly accepted system of the civilized world.

To his credit be it recorded again, that his system is the foundation of all modern concepts of the sexual evolution and differentiation, and consequent relationships, of all known plants and animals, and especially of their nomenclature.

His personal and professional interest were so broad as to include special studies in insects and birds and in general zoölogy, as time allowed divergence from his life-work in botany. His writings covered the living things of the Old and New Worlds, and comprised some seventy or more titles.

His personality was of the kind which inspired every pupil coming under



him to branch out for himself in some line of natural history. His students became scattered throughout the world.

Up to the last, and as much as his failing health would allow, Linnæus kept up a lively and progressive interest in his science.

Finally, tired of life, and forgetful of all honors which had been so keen a delight to him, he passed beyond peacefully on the 10th of January, 1778.

His works and his name live forever.

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At the conclusion of Dr. Morris's address a musical selection was rendered by the Glee Club of the United Swedish Societies, after which the following address was delivered.

## LINNÆUS AND AMERICAN NATURAL HISTORY.

By FREDERIC A. LUCAS.

I presume that the question first in the minds of many present is, Why have we met this evening? why should we celebrate the two hundredth birthday of Linnæus?

In a general way, Linnæus may be said to have systematized the study of natural history, and arranged its known facts in an orderly manner; but his special claim to our gratitude is the invention or perfection of what is called the "binomial system" of nomenclature, that is, the use of the double name for each species of plant or animal. This may seem a small matter. In fact, those who ask Why doesn't every animal have a common name? might think they had reason to feel anything but grateful; but it was really one of the greatest advances made in natural history. For in science it is not enough to accumulate facts, they must be set in order, or classified, so as to be available. In fact, Huxley termed science "classified knowledge." Before the day of Linnæus, animals were mainly known by their descriptions or their vernacular name. The lion, for instance, would be called the "great tan-colored cat with a mane;" and, in order to indicate what species were related, it would be necessary to specify them each and all.

As the rising tide of commerce of the eighteenth century brought to Europe scores of animals previously unknown, the number of recognized species increased so rapidly that it promised to be a difficult matter to keep track of them. It was at this time that Linnæus devised the plan of applying to each animal a general or generic name which should indicate the immediate group to which the animal belonged, and a special or specific

name to apply to that particular kind of animal alone. And so binomial nomenclature was born. It has been claimed that Linnæus was not the first to use the binomial system, but, if not, he was certainly the first to employ it consistently and to frame rules relating to such use. Linnæus wrote in Latin not as a matter of affectation, but because Latin was the common language of culture and science, and to this day many naturalists still write descriptions of new species in Latin, or preface their accounts with a brief diagnosis in that language. Had he written in Swedish, his native tongue, his audience would have been a small one, probably limited to his native land; as it was, his works were understood by all the naturalists of the day. Hence his scientific names which were Latin names are, like a gold coin, current the world over, while the so-called "popular name" is restricted in its use, and circulates only in the country where it is coined.

But Linnæus did much more than devise a scheme of nomenclature: he systematically defined each and every group of plants and animals with which he dealt, giving their chief characters in a few brief words; and the small groups, or genera, he combined in large divisions termed "orders." It matters not that the genera of Linnæus have since been divided and subdivided many times, the underlying principle of assigning certain definite characters to each animal remains the same.

Linnæus was a born classifier. He was not happy until he had duly set in order the facts and objects that came under his notice; and while he did not, it is true, carry this to the extent of the eccentric Rafinesque, who made several genera and species of thunder and lightning, he did propose a system of classification for diseases wherein they were duly assigned to their respective families and genera.

To many the term "classification" is repellant. It seems to signify something with which the ordinary man has nothing to do, when really it is something with which every one is, or should be, concerned; for classification is simply arranging things in their proper places, and putting things of a kind together. And the man who puts his cuffs in one place, his collars in another, and arranges his shoes in a row on the top shelf of a closet, is a classifier.

The naturalist is confronted by the same problem as a general,—that of grouping or arranging the various plants or animals so that he may know where each one is to be found, or where to assign any new form that may come to light. For an army is not merely a large number of armed men, it is an orderly assemblage of men so classed and grouped that they can be handled by one man. And the classification of the animal kingdom, for example, is very similar to that of an army, and to the same end,—that any one may put into its proper place each of the thousands of units with which he has to do.

And Linnæus marshaled plants and animals as a general marshals his troops. And just as an army is composed of thousands of individuals, distinguished as officers and privates, formed into companies, regiments, brigades and divisions, so the thousands of species composing the animal kingdom are grouped into genera, families, orders, classes and phyla. In doing this, Linnæus instituted many minor reforms; for example, his characters were given in a definite order, and following the diagnosis was the synonymy, or list of names under which the animal had been described, and works in which it had been published. He was the first to strip natural history of its verbiage, and express himself in clear and concise language, and, had he lived to-day, I doubt not he would have been an advocate of spelling reform.

And yet, after all, this scheme of nomenclature is but a part of the service Linnæus rendered to natural history. It is not merely that his genius grasped the fact that nature was order, and that he devised methods for expressing this order; his zeal in the pursuit of knowledge gave a stimulus and purpose to the study of natural history that it had never felt before. In a way, his influence may be said to have been much like that of Agassiz in the United States, "He imbued [his pupils] with his own intense acquisitiveness, reared them in an atmosphere of enthusiasm, trained them to close and accurate observation, and then despatched them to various parts of the globe." It was not so much what he knew himself as the enthusiasm he inspired in others, that made him a power felt throughout the world.

It must ever be borne in mind that nomenclature, or the naming of plants and animals, is not the end of natural history, but only a means to an end,—a fact that many of our younger naturalists are prone to overlook. Too many of them seem to think that the great aim of the naturalist is to write "new species" after as many names as possible, when, to my mind at least, the making of new species is the most trivial work of the naturalist. It is important work, but only a step on the pathway of knowledge. The real problems are, Why do these species exist? what forces have brought them into existence? and what are their relations with one another?

The man who heard an overture for the first time, after listening a while turned to his friend with the query, When are they going to stop tuning up, and commence to play? So you may wonder why I chose for the title of this address "Linnæus and American Natural History." The truth is that Linnæus is so intimately connected with *all* natural history, that American natural history forms but a small part of the whole. And yet Linnæus was intimately concerned with the development of American natural history by his acquaintance with those men of science who were gathering and making known the fauna and flora of this continent; and as plants and animals were

brought to Europe, most of them found their way to Linnæus, and many were definitely named by him for the first time. The twelfth edition of the famous "Systema Naturæ" describes 210 mammals, 78 of which are American (including under that term North and South America); 790 birds are noted, of which 260 are American; and 88 of the 124 reptiles are also American.

We think of Audubon, Baird, Coues and Ridgway as the great American ornithologists, and they are great; but a glance at the check-list of the American Ornithologists' Union shows how prominent a part was played by Linnæus. The list of 1889 gives 729 species and subspecies. No less than 202 of these were named by Linnæus; while Audubon, the father of American ornithology, named but 33. Twenty-five bear the sign-manual of Coues, and 104 of Ridgway. We must, it is true, remember that a considerable number of the birds named by Linnæus are species common to Europe and North America, but, on the other hand, it must also be borne in mind that many named by Ridgway are what are called subspecies, which were not recognized in the day of Linnæus.

In the time of Linnæus there were few naturalists in the United States, but those were active; and that they approved of his methods is shown by a letter of Collin to Linnæus, in which he says, "Your system I can tell you obtains much in America. Mr. Clayton and Dr. Colden at Albany are complete professors, as is Dr. Mitchell at Urbana, Va." If this seems a pitifully small number to us, it must be remembered that in those days naturalists were few in number, and natural objects studied but little; and twelve years later there were in all England but seven botanists who were followers of the Linnæan methods. Those were the good times when one man knew the plants and animals of the whole globe. Now a naturalist may devote his entire time to the study of one small group, and the names of other plants and animals are often as unfamiliar to him as they are to the average man.

It is interesting, almost amusing, to see how little an idea Linnæus and his contemporaries had of the number of the animals in the world, for their most liberal estimates were very far from the facts. And this lack of knowledge Linnæus realized when he wrote at the end of his "Systema Naturæ," "*Ea qua scimus sunt pars minima eorum quæ ignoramus.*" Thus Ray in 1693, a short time before Linnæus began his career, estimated that there were about twenty thousand animals, including insects, in the whole world; and this was a very liberal estimate, for he actually described less than four thousand.

Now, Ray was what would be termed to-day a "lumper," and divided all living things into four great orders, — insects, fishes, birds and beasts,



the last including reptiles. The number of beasts he stated to be a hundred and fifty, adding his belief that "not many that are of any considerable bigness in the known regions of the world have escaped the cognizance of the curious." The birds he considered might reach as many as five hundred. Contrast this with the more than twelve thousand species so far described. The number of insects he considered might possibly reach twenty thousand species, a long way from Sharp and Walsingham's estimate of two millions, or Riley's of ten millions. Nowadays this estimate of Ray provokes a smile, and yet we can find an example of much greater complacency shown by one of our noted scientific men of much more recent date; for Dr. Coues about 1880 thought that few mammals remained to be discovered in North America. How badly he was mistaken is shown by Dr. Allen's review in 1894, showing that the number of recognized species had more than doubled in ten years, rising from 181 in 1880 to 369 in 1890; and since then many more have been described, not merely small creatures that to the ordinary observers are alike, but large animals like bears and mountain-sheep.

It well illustrates the activity displayed by naturalists of that day to say that by 1758 the number of known mammals and reptiles had increased to 334 and of birds to 790; the figures in the one case being an advance of a hundred per cent over those of Ray, and in the other of fifty per cent.

How thoroughly the world is being ransacked for new animals, and how actively naturalists are engaged in their description, may be gathered from the following figures. Up to 1830, species to the number of 71,598 had been described, by 1881 the number had risen to 211,553, and by 1896 to 366,000; more than 150,000 species having been described in fifteen years. And the vast and ever-growing host of living things — the beasts of the field, the birds of the air, the fishes that are in the water about the earth, to say nothing of the myriad species of the plant world — are each and all named in accordance with the method devised by Linnæus two centuries ago. Linnæus builded better than he knew, and his work has stood the test of time; and the methods he devised for classifying and naming animals are those in use now. His details may have been faulty, and the groups he considered as genera may have been divided and subdivided, but his plan stands.

Scores of animals known to Linnæus have been swept out of existence, and thousands that he never knew have been discovered; but the stimulus given by him to the study of nature remains unchecked, and to-day in many countries the members of learned societies have assembled, as we have gathered here, to do honor to the great Swedish naturalist. Sweden, indeed, chanced to be the birthplace of this great man, but genius is not fettered by time and space, belonging rather to all time and to the whole world.

At the conclusion of Mr. Lucas's address the Glee Club sang a second selection, and then the evening exercises ended with an exhibition, by means of stereopticon views, of plants and animals known to Linnæus, in charge of Dr. A. J. Grout and Mr. Lucas.

In the Borough of Manhattan the day was rounded out at the New York Aquarium, Battery Park, where the New York Zoölogical Society gave a reception to the Academy and the guests of the occasion. This function likewise commemorated the centennial anniversary of the erection of the building and gave the first view of the collections by night. A feature of the reception was the exhibition of forms of marine life known to Linnæus.

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An important and highly interesting feature of the Linnæus celebration lay in the following documents contributed by sister societies in many parts of the world, and letters written by several of the Honorary Members of the New York Academy. Each is reproduced here in the language in which it was sent in.

#### **Kungl. Svenska Vetenskapsakademien, Stockholm.**

It is with great pleasure that the Royal Swedish Academy of Sciences has received in these days, from all parts of the world, the most gratifying testimonies of the great admiration and esteem in which our first president, Carl von Linné, is held by all those who love and study nature. Your invitation has also been accepted with great gratitude: it was, however, received so late that it was impossible to take any measures for participating in your celebration in such a way as would have been desirable to us. You have expressed your wishes that we should contribute an official document appreciative of the work of Linné. There is, however, no opportunity now to prepare such a document, and we must thus confine ourselves to a short statement elucidating our opinion.

There were many great naturalists before Linné, if we count from Aristoteles to Ray and Willughby. There was certainly a great amount of knowledge, also, concerning animals and plants; but there was no system, no scientific names or terms. The facts that were known in natural history before Linné were thus heaped without order, or with very little order, like a pile of bricks and stones at a building-place. Linné was the great architect who made the plan for the erecting of the building, — the system; and he furnished at the same time the mortar — the nomenclature — for cementing

together the stones and bricks. It may be admitted that more practical and more beautiful buildings have been constructed since that time in the scientific world; but he was and he remains the great master, who, with brilliant genius and admirable skill, first taught us how to put in order and systematically arrange the material, and thus make a true science of natural history. This has also been universally admitted; and the renowned British naturalist Pennant writes about this part of Linné's work, "He hath in all his classes given philosophy a new language; hath invented apt names, and taught the world a brevity, yet a fullness, of description unknown to past ages."

Many persons not familiar with Linné's work have believed that Linné contented himself with describing the exterior of the objects in nature, and then named them. Nothing can be more erroneous; that is proved by the program or the "Methodus" which Linné published even in the first edition of "Systema Naturæ." This "Methodus" is in its thirty-eight short paragraphs the fullest and richest program which any student of natural history has ever published. Referring to this we may affirm that no branch whatever of biological study was neglected or underrated by Linné. He grasped fully the importance of the study of anatomy, and he advised his scholars to dissect animals and also to make a frequent use of the magnifying glass. His ardent love of living nature made him an excellent biologist in the restricted sense of that word.

Even if his greatest works were of a systematic and descriptive nature, it becomes evident to any one who has only a superficial knowledge of what Linné has written, that his genius extended with unbounded flight to cover much wider areas of philosophical speculation. Although he did not see it in the light of the theory of evolution,—it was indeed far too early for that,—the general struggle for existence, as well as the idea of sexual selection, was well known to him. And many other problems of modern times did he touch. Let us only recall the fact that to the pious and pure mind of this great naturalist there was no objection to place *homo sapiens* as the first link in the continuous chain of organisms.

His works may shine with everlasting brightness through all ages, as long as mankind devotes itself to the study of nature. His name is *ære perennius*, but this Academy of Sciences and the whole people of Sweden feel deeply and are gratefully touched by the honor which now is bestowed upon our great compatriot, when his name is given to a monumental bridge connecting the Botanical Garden and the Zoölogical Park in New York.

K. A. H. MÖRNER.

CHR. AURIVILLIUS, *Secretary.*

**Kungl. Svenska Vetenskapsakademien, Upsala.**

The Royal Society of Sciences at Upsala has had the honor and the pleasure of receiving your letter, informing them of the impressive manner in which the memory of their great countryman, Carl von Linné, will be celebrated in the metropolis of the United States.

To every Swede, and especially to our Society, whose honor it is to count Linné as the greatest ornament of its ranks, it is highly gratifying to see that the memory of the man whom all the world recognizes as *princeps botanicorum*, is also beyond the Atlantic held so sacred that the two hundredth anniversary of his birth will be celebrated there with the same love and reverence as in his own country. And we fully appreciate the delicate courtesy which has led you to immortalize his name among you by dedicating to him the beautiful bridge which unites your Botanical Garden with the Zoölogical Park.

The necessity of answering your honored letter without delay renders it impossible for the Royal Society of Sciences to enter more fully on the epoch-making significance of the great Linné's life and work. Nor do we consider it necessary for us to do so, least of all in relation to your renowned Academy, which takes the lead in the grand scientific evolution of America. Do we not both realize that Linné's great genius has laid the foundations on which botanical science goes on building this very day? We both realize the unceasing debt of gratitude which both hemispheres owe to his immortal name. And so on both sides of the Atlantic we celebrate with deep-felt enthusiasm the two hundredth anniversary of his birth.

We offer you our best wishes on the memorable day, and congratulate you on your successful work in the immense field of learning.

J. A. EKMÁN, Archbishop of Sweden,  
*President.*

N. C. DUNÉR, *Honorary Secretary.*

**Professor Hans Reusch, Kristiania, Norway.**

*(Honorary Member of the Academy.)*

In my working-room at the Geological Survey of Norway for many years I have had only one portrait hanging, — that of Linnæus. I regard him as the household spirit of every good naturalist.



### The Geological Commission of Finland.

On behalf of the Geological Commission of Finland, we desire first of all to express our high appreciation of the honor rendered us in inviting the Commission to take part in the celebration, by the New York Academy, of the two hundredth anniversary of Carl von Linné.

We are proud to think that we have some right to reckon this great memory among our own, because Finland in Linné's time was united to Sweden; and a large number of us Finlanders are still, by language and descent, connected with that land. Among his disciples were also several of our countrymen; and the interest which ever since that period has existed here for the study of botany, and also of zoölogy, we regard as a direct inheritance from Linné's time. Not only naturalists *ex professo* have taken part in the investigation of the flora and fauna of our country, but also physicians, clergymen, government officials and the general public, who have, ever since Linné's days, constantly and with zealous eagerness lent their aid to the augmentation of our store of knowledge in things pertaining to natural science.

By his travels, among the first which were undertaken for a purely scientific purpose, Linné has also given an example to the numerous explorers who since his time have gone out from northern lands — among those born in Finland we may mention Laxman the explorer of Siberia, Castrén the linguist, and Baron A. E. Nordenskiöld, the geologist, and discoverer of the Northeast passage — and to all those who, after Linné's time, have united the courage and energy of the pioneer with scientific thoroughness.

We geologists remember in especial that Linné — who had very correct ideas of the geological sequence among the silurian rocks of Sweden and the importance of fossils, and whose conception of the geological importance of the deluge was for his time unusually free from bias — can be reckoned among the early pioneers of geology and as a predecessor of the great naturalists who somewhat later, in Scotland and Saxony, laid the foundation-stones of scientific geology. He had a notion of the immense length of geological time, and expressed opinions which contained the germ of the actualistic doctrine that afterwards proved so fruitful for our science.

It has been the mission of the Anglo-Saxon nations to work out this doctrine and to build up on this basis the science of geology. When in our days we Northerners see without jealousy the hegemony in natural science pass over to the great nations which have continents for their field of research, we still remember with pride that it was at one time held by the little nation to which Linné belonged, and see in the festival with which

your honored society celebrates the two hundredth anniversary of his birth a recognition that all scientific exploration which is carried on in an unprejudiced spirit of order and truth is a work in the spirit of Linné.

Remembering the bond which thus connects your great nation with the small countries of northern Europe, we wish especially to recall to you one of Linné's disciples, the explorer Pehr Kalm, professor of botany at the University of Åbo in Finland. He was very highly esteemed by his great teacher. In Linné's list of the naturalists of his time, in which each one was distinguished with a certain rank, Linné himself was general, and Kalm had the rank of major. Commissioned by the Royal Swedish Academy of Sciences, Kalm, as is well known, traveled far into North America, and afterwards published an uncommonly accurate and minute account of his observations, which was translated into several languages. He penetrated into what was then considered the Far West, to the Lake of Ontario; and it was through his letters to Benjamin Franklin, in which Kalm with his usual minuteness described the Falls of Niagara, that this great wonder of nature first became more generally known.

What a lapse of time has passed since that visit of the disciple of Linné to North America!—a time measured more properly by the wonderful development of civilization than by the number of years that have gone by. Over this vast continent, where then were forests and prairies, the abodes of the wild Indian, has the white man now built his homes, and it is strewn with schools in which the children learn to designate the plants and animals with the names given them by Linné. Everywhere there are universities in which the study of natural science is carried on with the aid of means and appliances which Linné never could have dreamed of. Where Kalm, at the mouth of the Hudson River, found a town which he says was then "about half as big again as Gothenburg in Sweden," lies now one of the greatest cities of the world; and in this city the two hundredth anniversary of Linné is now celebrated in a way that shows that his memory is as much honored there as in his fatherland.

What a proof of his greatness, what a guaranty that he will forever be regarded as one of the master-minds of mankind!

J. J. SEDERHOLM.

BENJ. FROSTERUS.

**Senaat der Rijks-Universiteit te Leiden.**

The Leiden University Senate has the honor to present its congratulations to the New York Academy of Sciences on the occasion of the commem-

oration festivities celebrating the two hundredth anniversary of the birth of Carl von Linné. The whole scientific world unites in grateful veneration of an admirable scholar, whose reputation is least of all lost in the land where he spent three of the most fruitful years of his life. Our Senate expresses its feelings of cordial sympathy with the way in which the New York Academy of Sciences intends to celebrate the anniversary of his birth by the erection of an architectural monument symbolizing the work of a man whose genius embraced the two realms of living nature.

For the Senate

W. NOLEN, *Rector Magnificus*.

H. P. WIJSMAN, *Secretary*.

Professor A. A. W. Hubrecht, University of Utrecht.

(*Honorary Member of the Academy.*)

The great Swede whose birth — now two hundred years ago — will be commemorated all over the world on May 23, passed many years of his life in Holland. It is thus natural that many local reminiscences are connected with his name in different parts of this country. If we allow our thoughts to go back for more than a century and a half, we can imagine Linnæus roaming about on his botanical excursions over those same fields between 's Graveland and Hilversum where Hugo de Vries lately encountered an emigrant from the United States (*Oenothera lamarckiana*) that was to become a starting-point for new and important speculations about the species problem.

The foundations for an answer to that problem were laid in a quite masterly manner by Linnæus. In the latter half of the nineteenth century we have, however, been accustomed, after reading Darwin's works, to consider the problem as non-existing; species, apparently, being in slow and imperceptible continuity.

Hugo de Vries has again limited species between the occurrence of two mutations, each species thus being a real entity in time and in space. This does not prevent de Vries from being at the same time one of the staunchest disciples of Darwin, in whose steps he is treading.

Linnæus's species differ from de Vries's in that they are the primary network between the meshes of which de Vries has spun out the lacework of the mutation theory.

The new generations thus attempt to continue Linnæus's and Darwin's work, and unite in paying homage to the memory of the founder of the "Systema Naturæ."

**L'Académie de Médecine de Paris.**

L'Académie de Médecine de Paris est heureuse de répondre à l'invitation qu'elle a reçue de l'Académie des Sciences de New-York, à l'occasion du deuxième centenaire de la naissance de Linné. Elle s'associe cordialement aux hommages rendus à la mémoire de l'illustre naturaliste par les corps savants de la grande cité américaine.

Tout a été dit sur l'œuvre de Linné et sur la révolution qu'il a opérée dans les sciences naturelles. Au milieu de la confusion et de l'obscurité qui régnaient avant lui, il a su, le premier, dégager et rendre fécondes les idées générales éparses dans les écrits de ses devanciers; partout il a porté l'ordre, la clarté et des réformes heureuses.

Observateur incomparable, à l'amour de la vérité, il joignait une imagination vive, un esprit fertile et sagace, l'expression verbale pittoresque et le sentiment profond des choses de la nature. Ses écrits occupent depuis longtemps la première place dans l'estime des savants, et l'on se demande, en voyant leur prodigieuse étendue, ce qui doit le plus étonner, du nombre de ces ouvrages ou de l'importance de chacun d'eux.

Mais, de tous les titres de Linné à la reconnaissance de la postérité, le plus beau est sans contredit celui de fondateur de cette langue scientifique nouvelle, la nomenclature binaire, qui constitue le plus grand progrès accompli dans les sciences naturelles au dix-huitième siècle. A la prolixité confuse des descriptions antérieures, il substituait un langage net et précis, en introduisant l'usage de désigner les êtres par un nom de genre, qui les unit, et par un nom d'espèce, qui les distingue. La nomenclature linnéenne s'est étendue à toutes les branches de l'histoire naturelle; elle en a prodigieusement facilité l'étude en fournissant une langue commune aux savants de tous les pays.

Le système de classification établi par Linné n'a pas moins contribué aux progrès de la botanique pendant près d'un siècle. Dans ce cadre artificiel, les plantes nouvelles se rangeaient aisément d'après un petit nombre de caractères empruntés à la fleur et judicieusement choisis. Dès lors l'étude des végétaux devint accessible à la multitude, les recherches scientifiques se multiplièrent dans toutes les parties du globe avec une activité considérable.

Toutefois, l'esprit philosophique du grand naturaliste ne pouvait manquer de saisir toute l'importance d'une méthode plus parfaite, et, s'il ne lui a pas été donné de la réaliser lui-même, on peut dire du moins qu'il en a été le plus ardent promoteur et que nul, plus que lui, n'a contribué à l'avènement de la grande réforme opérée plus tard par Laurent de Jussieu.



Professeur de médecine, Linné s'est efforcé de diriger l'étude de la botanique vers les applications à l'art de guérir. Il a eu le mérite de formuler nettement le principe qui devait servir de guide à la recherche des propriétés médicamenteuses des plantes, principe fondé sur les analogies des caractères botaniques et des caractères chimiques des végétaux. Si les successeurs de Linné ont parfois exagéré la portée de la théorie, elle n'en a pas moins ouvert une voie féconde aux recherches ultérieures.

L'ancienne Société Royale de Médecine de Paris, dont notre Compagnie a recueilli l'héritage, a compté jadis l'illustre professeur d'Upsal au nombre de ses Associés étrangers. L'Académie de Médecine de Paris est donc particulièrement qualifiée pour célébrer avec vous l'anniversaire du grand naturaliste suédois. Elle remercie l'Académie des Sciences de New-York de l'avoir conviée à cette commémoration, qui lui permet d'exprimer ses sentiments d'admiration et de reconnaissance pour le savant dont l'œuvre géniale a projeté sur le monde une si vive et si puissante lumière que l'éclat n'en est pas encore affaibli.

ARMAND GAUTIER, *Le Président.*

JACCOUD, *Le Secrétaire perpétuel.*

#### Université de Lyon.

Le Conseil de l'Université de Lyon est heureux de s'associer moralement au deuxième centenaire de la naissance de l'illustre naturaliste Suédois Charles Linné. Il adresse à cette occasion l'hommage de son admiration profonde pour le créateur de la première classification scientifique des règnes animal et végétal; pour l'inventeur de la nomenclature binominale qui a introduit une si lumineuse clarté dans le chaos jusque là obscur de la nomenclature biologique; pour l'immortel auteur du "Systema Naturæ" qui est le premier inventaire universel des richesses du monde animé.

Il envoie en même temps à l'Académie des Sciences de New-York l'expression de sa gratitude la plus cordiale pour l'aimable pensée qu'elle a eue d'associer l'Université de Lyon à cette fête de la Science internationale.

T. JOUBIN, *Le Recteur,*

*Président du Conseil de l'Université.*

#### Société des Amis des Sciences Naturelles de Rouen.

La Société des Amis des Sciences naturelles de Rouen (France) a l'honneur d'exprimer à l'illustre Académie des Sciences de New York sa vive

satisfaction de savoir qu'un pont de cette admirable ville sera dédié à l'immortel Linné, dont les travaux géniaux constituent la base de la taxinomie, et dont le nom sera perpétué à jamais par les innombrables espèces animales et végétales qu'il a décrites.

La Société des Amis des Sciences naturelles de Rouen prie l'illustre Académie des Sciences de New York d'agréer l'hommage de sa respectueuse admiration, joint à l'assurance de ses meilleurs sentiments de confraternité.

HENRI GADEAU DE KERVILLE, *President*.

### Société d'Histoire Naturelle de Toulouse.

ELOGE DE LINNÉ, APPRECIATIVE DE SON ŒUVRE.

"Tibi suaveo dædala tellus  
Summittit flores." — LUCRÈCE, *De Natura Rerum*.

C'est à vous, divin naturaliste, que l'univers entier présente en ce jour ses plus belles fleurs.

Nous saluerons tout d'abord le savant qui d'un trait de son puissant génie, saisit la structure intime des végétal. Lui aussi a eu la gloire d'ouvrir un des sanctuaires de la nature et de s'initier le premier à quelques-uns de ses secrets.

"Effringere ut arcta  
Naturæ primus poetarum claustra cupiret." — LUCRÈCE.

Avant Linné le végétal d'était qu'un vulgaire objet d'admiration, l'élément à la fois réjouissant et décoratif du paysage. Mais le génie du botaniste que nous fêtons eut y lire tout un monde nouveau, et de la comparaison de ce monde avec celui des animaux sut brillamment dégager la nation de hiérarchie entre les deux règnes, entre le végétal et l'animal. Alors se dessina en quelque sorte le premier anneau, la trame primordiale qui devait bientôt amener l'esprit de l'homme à se représenter une chaîne complète des êtres. Reconnaissons donc en Linné un ancêtre de Darwin.

Mais le règne végétal s'est en quelque sorte animé sous le regard de ce scrutateur amoureux de la nature. Qu'est ce en effet pour Linné que cette riante parure que nous nous plaisons à appeler corolle de la fleur? Tout simplement le lit nuptial des organes sexuels, ceux qui reproduiront l'espèce. Et que seront, examinés attentivement, chacun de ces derniers organes, tant mâle que femelle, sinon un renduient, une ébauche un "canevas" de celui de l'animal, comme a fait si bien ressortir le physiologiste Bichat? C'est cette découverte qui constitue le trait original et saillant entre tous, le trait de génie, répétons le, de l'œuvre de Linné. Derrière l'homme de génie nous devons admirer le philosophe.

Aussitôt que Linné eut eue bien présente dans son esprit la continuité de la chaîne, disons mieux de l'échelle des êtres vivants avec leur lois générales communes aux deux règnes à la fois, il eut aussi toutes despoées d'une façon très régulière les bases d'une classification des végétaux. Il les répartit en vingt quatre catégories, basées toutes sur les rapports des organes mâles et des organes femelles dans une même fleur ou dans des fleurs séparées, les organes sont respectivement appelés les "maris et les femmes" par Linné. Signalons à titre de curiosité:

*La classe xiv, Didynamie.* — Deux puissances quatre maris dont deux plus grands et deux plus petits.

*La classe xxi, Monœcie.* — Une seule maison: les maris habitent avec les femmes dans des lits différents (dans la même maison).

*La classe xxii, Diœcie.* — Les maris habitent des domiciles et des lits divers.

*La classe xxiii, Polygamie.* — Plusieurs noces: les maris habitent dans des lits distincts avec des épouses légitimes et des concubines.

*La classe xxiv, Cryptogamie.* — Noces cachées, les noces sont célébrées clandestinement.

Cette théorie, toute géniale qu'elle était, n'était pas cependant destinée à subsister. Elle n'en demeurer pas moins comme le plus beau monument de l'âge d'or de la botanique. Aussi le chemin était frayé dans le domaine végétal: la notion de la classification allait devenir un chapitre important des études philosophiques, et, grâce à une plus complète connaissance de la nature, la philosophie elle même allait prendre un nouvel essor, agrandir, transformer son domaine, descendre des hauteurs métaphysiques à des données plus positives. Et cela jusques au jour où le progrès incessant des sciences naturelles viendrait introduire une nouvelle idée géniale, grâce à laquelle les deux règnes auraient des tendances à la confondre en un seul: par voie de progrès nous avons nommé cette évolution dont Linné avait jeté les premiers fondaments. Comme il était loin, quand il écrivait la *Philosophia Botanica* de pouvoir entrevoir seulement la grandeur future de l'édifice dont il jetait las assises! Quelle est enfin l'épithète qui convient à Linné au milieu de ce que l'on pourrait appeler le "chœur des botanistes?"

Un savant Suisse, Rueper, s'est plu à caractériser chacun des grands historiens du règne végétal. Il nous représente le très subtil Adanson. Le très ingénieux Bernard de Jussieu, les éminents Robert Brown et De Candolle, quant à Linné, il a sa place suréminente, c'est le divin Linné, divers Linnæus! Le divin Linné! nous lui maintiendrons ce sublime titre, puisque ce fut un des privilèges surhumains pour ainsi dire, doué des lumières tout à fait supérieurs, qui sert ouvrir une des portes d'un sanctuaire de la nature, introduisent aussi à sa suite dans ce domaine réputé

inaccessible jusques à lui toute une legion d'éminents travailleurs destinés à eu explorer les recours et à continuer son œuvre!

Le divin Linné! n'avait-il pas en effet comme profondément gravée dans tout son être l'empreinte de cette Divinité qu'il ne perdit jamais de vue? ne considerait il pas l'œuvre qu'il avait accompli dans la science comme le plus bel hommage qu'il fut capable de lui rendre quelques unes de ses pages redisent plusieurs fois le nom du Créateur de tous les êtres. Comme nous regrettons de n'avoir pu retrouver cette prière, si sublime dans sa brevité, dans laquelle il exprime à l'auteur de la nature sa reconnaissance eternelle pour la joie qu'il ressent de l'œuvre qu'il lui a permis d'accompli! Bornons nous à mentionner les invocations qui terminent un de ses chapitres:—

“O Jehovah, quam ampla sunt opera tua!  
 Quam ea omnia in sapientia fecisti!  
 Quam plena est terra possessione tua!”

Ce sont les propres accents de David, au psaume 103, mais sur un ton plus renforcé.

Saluons en terminant l'heureuse patrie de Linné, la Suede. La race des génies, si brillamment inaugurée par le botaniste dont nous fetons aujourd'hui l'anniversaire deux fois séculaire de la naissance, cette race disons nous, ne paraît pas volontaire s'épuiser en Scandinavie. Qu'il nous suffise de nommer un contemporain, le célèbre chimiste Arrhénius, qui semble lui aussi, par sa belle théorie des ions, avoir révolutionné à la fois le monde chimique et le monde électrique, préparant ainsi une nouvelle voie aux découvertes industrielles de l'avenir. L'œuvre de Linné était dans le règne végétal. Arrhénius a roulé la tente dans un troisième règne, celui dont toute vie est excluë; les secrets qu'il croit en où arrachés à la nature sont d'un ordre encore plus intime et plus mystérieux que ceux que lui avaient derobés le grand botaniste. Comme consequence des travaux de ces deux grands hommes, la science peut dire aujourd'hui avec plus de raison que le hero de Lucrèce: Il y a plus bien de mystérieuse dans la nature: nous avons triomphe de toutes les barrières, et nous avons conquis la notion du degré de puissance qu'a été delimité à chaque être et de la borne qu'il ne peut dépasser.

“Unde refert nobis victor quid ponit oreri,  
 Quid nequeat, finita potestas denique eusque  
 Quanam ut ratione atque alte terminus hærens.”  
 LUCRÈCE, *De Natura Rerum*.

H. DE LASTÉE, *Bibliothécaire*.



**Professor Charles Barrois, University of Lille.**

*(Honorary Member of the Academy.)*

C'est un très doux sentiment pour les savants de la vieille Europe de vivre un jour en pleine communion d'idées avec les savants de la jeune Amérique, pour jeter le souvenir d'un maître commun, d'un bienfaiteur de la science. L'histoire, les nations, l'homme ont bien évolué depuis le jour de Linné; le respect dû a son nom demeure, et s'en va grandissant. Puisse son exemple faire des émules nombreux dans votre grand pays, qui de nos jours rend de si éminents services à la cause de la science.

**Kaiserliche Leopoldinisch-Carolinische Deutsche Akademie der  
Naturforscher, Halle A.S.**

Der New York Academy of Sciences entbietet die Kaiserliche Leopoldinisch-Carolinische Deutsche Akademie der Naturforscher zu der Feier des 200-Geburtstages von KARL VON LINNÉ einen Gruss, da sie sich eines weiss mit derselben in dem Bestreben den grossen schwedischen Naturforscher zu ehren. War doch unsere Akademie die erste wissenschaftliche Körperschaft, welche bereits 1736 den jungen Linnæus in ihre Mitte aufnahm und ihm den glanzvollen Beinamen eines Dioskorides Secundus beilegte. Wohl auf keine anderen Geistesheroen kann das stolze Wort: Deus creavit, Linnæus disposuit auch nur annähernd angewendet werden. So unscheinbar die Linnæus borealis ist, umso grösser steht Linné als Naturforscher da. Aber nicht nur als Botaniker und Zoologe erwarb der Jubilar unsterblichen Ruhm, auch in der Medizin leistete er für die damalige Zeit in der Materia Medica wie der Diätetik Hervorragendes und war wohl derjenige, welcher in Schweden für die pathologische Anatomie als bahnbrechend anzusehen ist, da er die Leichensektionen daselbst einbürgerte.

Der New York Academy of Sciences gestatten wir uns anbei den Abdruck eines Aufsatzes zu überreichen, welcher zu Ehren von Karl von Linné in der Leopoldina soeben erschien.

A. WANGERIN, *Präsident.*  
ROTH, *Bibliothekar.*

**Geh. Rat Professor Dr. H. Rosenbusch, University, Heidelberg.**

*(Honorary Member of the Academy.)*

. . . Leider ist es mir bei der Fülle von Arbeit, die vor mir liegt, nicht möglich, Ihrem Wunsche [for a document to be read at the Bicentenary] zu entsprechen, aber Sie dürfen überzeugt sein, dass meine Gedanken und Wünsche am 23 Mai bei Ihnen in New York sein werden. Möge Ihr Fest den schönsten Verlauf nehmen und ein freundlicher Stern über der schönen Brücke walten, die den Namen eines der bedeutsamsten Begründer der Naturwissenschaften tragen soll.

Ihre Nation gibt der ganzen Welt ein nachahmungswürdiges Beispiel, indem sie ein stolzes Werk der modernen Technik nach einem Forscher benennt, dessen ganzes Leben dem höchsten menschlichen Gute, der Wissenschaft, geweiht war.

**Regia Societas Scientiarum Bohemica, Prague.**

The Royal Bohemian Society of Sciences in Prague, fully appreciating the importance of celebrating the two hundredth anniversary of Carl von Linné's birth by the New York Academy of Sciences, is glad to join the sister institutions in honoring this great naturalist, whose efforts in the first splendid achievements and developments of biology are of perpetual value.

When, in the beginning of modern times, in the multitude of known and newly discovered organic forms, there was a complete chaos to be feared instead of an exact distinction of them, it was the genius of Linné which arranged the masses of raw material into the scientific edifice of a strictly logical system. Linné's epochal "*Systema Naturæ*" laid the foundation for all future systematics of animals and plants.

Introducing the descriptive method and terminology, establishing a clear definition of each species in its genus, order and class, Linné gained a firm basis for an exact deduction of organic forms. It was Linné who at the same time united the analytical and synthetical tendencies of his predecessors into an efficient discipline.

Linné's method has facilitated the knowledge of the flora and fauna of whole territories, and we have to thank this method that also in Bohemia very early efforts for a systematical analysis of the organic world have been brought to full efficiency.

The Royal Bohemian Society of Sciences, the oldest center of scientific

efforts in Austria, has from the very beginning of her existence founded her work on Linné's teaching, and has in progress of time, with the increasing numbers of successful scientists amongst her members, continually contributed to the systematical knowledge of organic life in Bohemia. We need only point out the old classical systematicians of zoölogy and botany, — M. E. Bloch, Von Stein, K. P. Presl, Lad. Čelakovsky, and others who enriched the publications of the Royal Bohemian Society of Sciences in the spirit of Linné.

And the researches of modern times, so important for the study of organic life in the enormous mass of its zoölogical and botanical forms, though they are far advanced in their ideas and methods, still must always gratefully remember the invaluable deserts of the great Linné for the foundation and development of biology.

For the Royal Bohemian Society of Sciences:

K. VRBA, *President*.

DR. V. E. MOUREK, *General Secretary*.

F. VEJDOVSKY, *Secretary of the Class for  
Mathematical and Natural Sciences*.

#### **La Société de Physique et d'Histoire Naturelle de Genève, Suisse.**

La Société de Physique et d'Histoire naturelle de Genève s'associe de grand cœur à la manifestation que font les Sociétés Américaines pour célébrer le bi-centenaire de Linné.

Genève, plus que toute autre, s'y associe avec joie: ses naturalistes tels que les Vaucher, les de Candolle, les de Saussure ont toujours hautement apprécié l'œuvre du grand Suédois, et leurs descendants ne peuvent que suivre leurs traces et applaudir à tout ce qui pourra perpétuer la mémoire de ce savant.

Notre Société adresse donc des vœux chaleureux pour le succès de la manifestation américaine, qui sera digne de celui qui a laissé une trace si profonde dans les sciences naturelles.

A. BRUN, *Président*.

#### **Specula Vaticana, Rome.**

The Specula Vaticana heartily joins in your celebration of the two hundredth anniversary of the birth of Carl von Linné.

The astronomers of the Specula recognize a close relation between their

own realm and that of the distinguished Swedish naturalist, in that stars and flowers are called the "eyes of the heavens" and the "eyes of the field," which, with the eyes of the child, are numbered among the most precious gifts of the Creator.

We rejoice with you that Linné has unfolded to us the beauties and riches of the eyes of the field, which, no less than those of the heavens, show forth the glory of God.

JOHN G. HAGEN, S.J., *Director.*

### **Reale Osservatorio di Palermo, Italia.**

Poichè in occasione del secondo centenario della nascita di Carlo Linneo, che cotesta Accademia celebrerà il 23 corrente, la S. V. Illma mi ha gentilmente invitato a contribuire un documento ufficiale apprezante l'opera del Naturalista Svedese, io, non avendo una competenza sufficiente per dire cosa degna di un così eminente Scienrato in una ricorrenza così solenne, mi sono rivolto per aiuto al mio illustre collega Prof. A. Borzì, direttore del R. Giardino Botanico e Coloniale di Palermo, il quale mi ha risposto con la lettera che qui Le hascrivo.

"E'tanto difficile dire qualche cosa di nuovo su Carlo Linneo che io mi trovo imbarazzato a rispondere alla sua domanda. Da quasi due secoli tutte la vita di questo sommo Naturalista è stata indagata in ogni più minuta particolarità, tutte le sue opere studiate con tanta profondità di dottrina, che io non saprei che cosa dire. Certamente di Linneo si può affermare che nessun botanico o naturalista raggiunse a così alta fama come Lui: non v'è persona mediocrementemente colta che non rammenti il nome di Carlo Linneo, mentre di tanti e tanti altri insigni naturalisti il ricordo non ha vareato così vasti confini. Il più grande merito di Linneo, secondo me, non consiste rolamentemente nello avere riformato e piantato su basi incrollabili la sistematica vegetale, ma sopra tutto quello di aver tracciato le linee fondamentali della Botanica Scientifica moderna divinandone meravigliosamente i concetti. Basta leggere il piccolo libro intitolato "Philosophia botanica" per convincersene.

"Forse potrà far piarere all' Accademia de New York il comunicarle un documento inedito curiosissimo che interessa la storia del nostro Istituto Botanico a proposito di Carlo Linneo. Quando nel 1792 si fondò l'Orto Botanico di Palermo fu eretta una statua in onore del sommo botanico svedese. Lo scultore fu Vitale Zuccio, che la modellò in istucco il doppio del naturale. Questa statua fu copiata da un ritratto di Linneo, dal Linneo stesso giudicato il più somigliante e dovuto al pittore Roslins. Il Zuccio,



scultore palermitano, non ebbe la occasione di vedere questa pittura, ma semplicemente una incisione eseguita dall' artista Bervic nel 1779. Importante però è il fatto che la prima statua eretta in onore di Linneo fu la nostra, mentre il primo ricordo marmoreo (un merzo busto) dell' insigne botanico, che si conosca, e quello che eresse il giardino delle piante di Parigi il 1790. La patria di Linneo ebbe al 1820 la prima statua dell' immortale suo figlio."

Io mi un pregio di mandare a Lei una fotografía della statua di Linneo di cui ha partato il Prof. Borzi.

F. ANGELITTI, *Direttore.*

### **Real Academia de Ciencias Exactas, Físicas y Naturales de Madrid.**

La Real Academia de Ciencias exactas, físicas y naturales de Madrid estima como honrosa distinción el convite, que esa ilustre Academia le dirige, para contribuir á la celebracion del segundo centenario del nacimiento de Carlos Linneo.

Gustosísima se asocia á las solemnidades con que se festeje la veneranda memoria del naturalista, que, antes y mejor que otro alguno, supo imprimir órden, método y sistema al estudio y conocimiento de los seres naturales, dotándo á la ciencia de una nomenclatura y de una noción de las especies, base de todas las descripciones y agrupaciones de los seres vivos, posteriormente aceptadas.

España se complace tanto más vivamente en la exaltación de la obra del sapientísimo maestro sueco, cuanto que por intermedio de un discipulo suyo estuvo con él en constante comunicación mientras vivió.

Fenga pues, la Academia de Ciencias de Nueva York por presente en espíritu á la Real Academia de Ciencias exactas, físicas y naturales de Madrid, en todos los actos, con que el 23 de Mayo glorifique á Linneo.

JOSÉ ECHEGARAY, *El Presidente.*

FRANCISCO DE P. ARRILLAGA, *El Secretario.*

### **Royal Cornwall Polytechnic Society, Falmouth, England.**

To the members of the New York Academy of Sciences and assembled guests, on the occasion of the celebration of the bi-centenary of the birth of Carl Von Linné, the members of the Royal Cornwall Polytechnic Society (England) send greetings.

As the parent of all societies calling themselves by the name Polytechnic, and having from its birth, in 1832, consistently adhered to the purpose of its founders, viz., — the encouragement of science, as well as the fine and industrial arts,— the Royal Cornwall Polytechnic Society offers its congratulations to its fellow-workers in the domain of science in the great city of New York, on the practical and comprehensive character of the commemorative exercises which their enterprise and wisdom have projected for the interesting occasion falling on May 23 next. It trusts nothing will occur to prevent each function from realization in a manner befitting the memory of so great a benefactor to natural science, and fully sustaining the prestige of one of the foremost of the learned societies in America.

While leaving it to societies of wider renown to express the world's indebtedness and gratitude to Carl von Linné, who has been truly styled "the father of modern systematic natural history," and who was the founder of the now universally adopted binominal system of scientific nomenclature, the Royal Cornwall Polytechnic Society cannot, on this historic occasion, refrain from recording its own appreciation of the work accomplished by one who, though a distinguished son of Sweden, belongs, by virtue of his brilliant achievements, to every land and people.

The careful and far-reaching character of the investigations of Carl von Linné probably stand without parallel in the annals of science. Surrounded in early life by conditions which would have deterred most men, genius and a whole-hearted enthusiasm for the pursuit of knowledge in a direction where he was destined subsequently to hold a position which, after the lapse of two hundred years, is still unique, his clear insight, added to his almost incomparable faculty for dealing with vast accumulations of material, enabled him, after years of constant devotion to his self-imposed task, to evolve cosmos out of chaos. The foundation which he laid for the determination of genera and species was the soundest that science had been invited to adopt, and on it succeeding generations have reared a noble structure.

What the New York Academy of Sciences has been able to accomplish, what the Royal Cornwall Polytechnic Society has done for the encouragement of the many branches of natural science, what is being done by kindred societies all the world over, has been made possible through the new era which was ushered in by the publication of the numerous erudite works from the pen of him to whom all nations are now paying homage.

To-day we think of the student whose indomitable courage enabled him to triumph over difficulties of the most trying kind, and to fill his appointed niche in human affairs; of the *man* whose life was so devout that his first sight of an English furze-bush, arrayed in all its golden splendor, was to

him fitting occasion for expressing gratitude to God; of the *distinguished scientist* on whom the world's greatest prizes had been freely showered, selecting one of the most unobtrusive of plants to perpetuate his own name. After two hundred years, Carl von Linné enters into full possession of his own well-earned estate, an estate fixed deep and indelibly in the heart and affections of every student of nature.

JOHN D. ENYS, *President*.

E. W. NEWTON, *Secretary*.

**The Manchester Literary and Philosophical Society, Manchester, England.**

The Manchester Literary and Philosophical Society willingly joins with the New York Academy of Sciences in its commemoration of the two hundredth anniversary of the birth of the illustrious Linnæus.

His profound insight into the affinities and disresemblances of organized beings; his vivid differentiation of natural groups; his pithy, crisp characterization of orders, genera and species; and his binomial principle of nomenclature, — all exercised a profoundly stimulating influence upon the progress of biological science.

Nor must the personal merits of the man pass unrecognized. His acknowledgment of the work of his predecessors, his self-sacrificing labors, the enthusiasm with which he inspired his students, and his remarkable humility — so fittingly commemorated in the *Linnæa borealis* — are qualities which provoke the admiration of naturalists, alike in the hemisphere in which he worked and in the hemisphere in which this commemoration is being held.

HAROLD B. DIXON, *President*.

FRANCIS JONES,	} <i>Honorary</i>
FREDERICK WILLIAM GAMBLE,	
	} <i>Secretaries</i> .

**Professor James Geikie, University of Edinburgh.**

(*Honorary Member of the Academy.*)

I deem it a high honor to be invited to place a little stone on the ever-increasing cairn raised by lovers of science all the world over in memory of Carl von Linné. The distinguished Swedish naturalist has made a name for himself that can never die. Admirable as an exact observer and careful collator of evidence, and no less admirable as a generalizer, he is an ensample to every sincere student of nature. Before this bright genius

appeared, the study of natural science was in a more or less chaotic state. Doubtless much knowledge of living things had been acquired before his time, but hitherto that knowledge had not been systematized. It was reserved for Linné not only greatly to increase the stores of learning, but to indicate how it was possible to group and classify the multitudinous forms of life so as to show that all formed part of one grand harmonious whole. One can hardly exaggerate his influence upon the study of the natural sciences. His was one of those creative, fertile minds from which all who made his acquaintance, either personally or through his writings, were bound to catch inspiration. He must have had a most engaging personality, and was undoubtedly filled with enthusiasm. How otherwise could he have drawn annually to Upsala some fifteen hundred pupils from all parts of Europe? His "*Systema Naturæ*," "*Genera Plantarum*," "*Critica Botanica*," and other famous works, are unquestionably notable landmarks in the history of natural science. Science and their influence we can to some extent estimate; but who can estimate the profound influence he must have exerted on the many thousand pupils who listened to his prelections, and who carried his enthusiasm with them into every civilized country! Honored and admired in his own day, Carl von Linné will ever continue to be recognized as one of the foremost men of all time.

### **The Royal Society of Canada.**

The President and Fellows of the Royal Society of Canada beg to offer their cordial thanks to the New York Academy of Sciences for its kind invitation to participate in the exercises commemorative of the two hundredth anniversary of the birth of Carl von Linné, and express their regret that they are unable to send a delegate to personally represent their Society on this most interesting occasion.

The Royal Society of Canada, which has just closed its Twenty-fifth Annual Meeting, shares with the New York Academy of Sciences and with kindred associations all over the world, in its high appreciation of the eminent services rendered to the natural sciences by the transcendent ability, judgment and foresight so remarkably displayed by the distinguished Swedish naturalist of the eighteenth century. To him is due in no small measure the modern system of scientific nomenclature, and by him were laid the foundations of the classification of animals and plants upon which biologists in all departments have since built their structures of scientific knowledge. It is therefore in the highest degree fitting that the name of so great a man as Linné, the precursor of a long line of eminent philosophers, should be



honored in America in the manner that is now proposed, and that the beautiful bridge connecting the Botanical Gardens and the Zoölogical Park in New York should by its name perpetually remind the passer-by of the greatness that may be achieved by intellectual and scientific attainments. In an age that may be considered sordid in many of its occupations and aspirations, such a reminder is of great value, and may lead many to think of the man, and endeavor, in however humble a manner, to tread in his footsteps.

All honor to the name of Carl von Linné! May the torch which he kindled with the flame of natural science, which has illuminated the path of numberless followers during two hundred years, never be extinguished! May we all strive by our diligent work, by our enthusiasm, by our lofty aims and high hopes, to keep it alive and pass it on, ever growing more and more brilliant, to those who shall come after us!

WM. SAUNDERS, *President.*

### **The Entomological Society of Ontario.**

The President and Officers of the Entomological Society of Ontario are pleased to have an opportunity of adding a few words, to the many which will be read at the commemorative exercises which are to be held on the 23d instant, in appreciation of the magnificent work which was done for the whole world of science by Carl von Linné, the founder of systematic natural history. It is, however, with deep regret that we find it impossible to send a delegate to take part personally in this celebration.

By entomologists and botanists especially, the name of Linné must always be held in reverence and respect, for to him is in large measure due the placing of these branches of natural history on a stable and permanent foundation. He was indeed the father of systematic biology; and the members of our Society feel that too much honor can never be bestowed upon the memory of so great a man. It is therefore a cause of much gratification that a lasting monument in the shape of a beautiful bridge crossing the Bronx River has been erected, which will be a constant reminder to all visiting the Botanical Garden and Zoölogical Park of the work which was done by this master mind.

JAMES FLETCHER, *President.*

CHARLES J. S. BETHUNE, *Secretary.*

**Sociedad Científica "Antonio Alzate," Mexico, D.F.**

By request of the Sociedad Científica "Antonio Alzate" of the City of Mexico, I have the honor to represent that distinguished Society as its delegate to the New York Academy of Sciences on the occasion of the exercises commemorative of the two hundredth anniversary of the birth of Linnæus.

The Society Antonio Alzate, which represents the scientific thought of the Republic of Mexico, is composed of men of high attainments, many of whom, through the important official publications of the Society and through other media, have made rich contributions to the sciences of botany, zoölogy, chemistry, astronomy and other branches of learning. These enlightened men are in full sympathy with the most advanced men of science in the United States.

The members of this important Society are fully imbued with the Linnæan spirit, and are animated by the same desire to emulate the great example of the master that inspires their New York brethren.

By the instructions of the Society Antonio Alzate I bring the friendly greetings and hearty sympathy of its members to the New York Academy of Sciences as it celebrates this interesting and notable anniversary.

GEORGE T. STEVENS, *Delegate*.

**The Museum of Comparative Zoölogy, Harvard University.**

The Museum of Comparative Zoölogy in Harvard University accepts with pleasure the invitation of the Academy to participate in the exercises commemorative of Linnæus, and it has requested Mr. William Brewster, a member of its staff, to represent it upon that occasion.

Linnæus embraced the whole department of natural history in its widest sense. His conspicuous contributions to botany have much obscured the fact that every field of nature was investigated by him with productive results. Throughout the entire range of inorganic and organic nature he passed with steady step, introducing methods of study and systems of terminology which brought order out of confusion.

Recognizing the indebtedness which all natural science owes to Linnæus, our Museum joins in the tributes which at this time the whole world is paying to his name.

CHARLES W. ELIOT, *President*.  
ALEXANDER AGASSIZ, *Secretary*.

### **The Boston Society of Natural History.**

The Boston Society of Natural History, through its official representative, Mr. JOEL ASAPH ALLEN, sends its greetings and congratulations to the New York Academy of Sciences, and desires to share in the celebration of the two hundredth anniversary of the birth of CARL VON LINNÉ.

Upon the basis of the scientific achievements of the great Swedish naturalist, all subsequent work in botany and zoölogy has been built up. To his labors and to the system introduced by him, we owe the possibility of recording, and thereby mastering, the immense and bewildering flora and fauna of the world. Our debt to him can hardly be overestimated: therefore the Boston Society of Natural History is glad to add its tribute of admiration and gratitude, and begs to thank the Academy for the opportunity of participating in the present noteworthy celebration.

CHARLES SEDGWICK MINOT, *President.*

### **The Connecticut Academy of Arts and Sciences.**

The Connecticut Academy of Arts and Sciences gratefully accepts the invitation of the New York Academy of Sciences to participate in the commemorative exercises to be held on the two hundredth anniversary of the birth of Linnæus.

The Academy appreciates the lasting influence which his work in botany and zoölogy has exercised on the development of these sciences throughout the whole world. Through his profound studies he was enabled to bring order out of the chaotic writings of his predecessors, to establish the science of taxonomy on a firm and satisfactory basis, and to prepare the way for a natural and logical classification of plants and animals.

The Academy has the honor to appoint Professor ALEXANDER W. EVANS as its authorized representative.

A. E. VERRILL, *President.*

GEORGE F. EATON, *Secretary.*

### **The American Journal of Science.**

The editorial staff of the "American Journal of Science" — whose birth in 1818 was contemporaneous with the beginnings of natural science in this country, and which for nearly a century has kept pace with the growth of

science, and ever striven to support and stimulate it — desires to express to you its profound appreciation of the debt we all owe to the great Swedish naturalist whose birth in 1707 you commemorate.

If science is classified knowledge, the highest credit belongs to him who brings scientific facts and observations into a rational system: in this work Linnæus stands pre-eminent. To his keen mind it was given not only to bring order among the genera and species of plants and animals, not only to build up a lasting system of nomenclature, but also to develop in these directions, as in the broader relations, a profound basis of classification which has had a lasting influence upon science in all its branches.

EDWARD S. DANA, *Editor-in-chief.*

**The Torrey Botanical Club, New York City.**

A clearly-stated conspectus of contents and an index so arranged that one may consult the contents with a minimum of labor are two crowning features of any volume. They reveal a systematic as well as a constructive intelligence on the part of the author, and mark the boundaries between chaos and clearness. It is with this feeling that botanists look back to Linnæus, not so much for the originality of his research as for his gift of order, by means of which the unclassified botanical observations of two centuries were reduced to a system. It matters not that this system perished almost in a generation; it served a purpose in its own day, and made progress possible to those who had previously been wandering over a boundless sea with neither stars nor sun to guide them. Linnæus is remembered, not because of his research, but because of his arrangement of existing knowledge in a usable form.

In spite of his blunders (for he was not free from them), in spite of his arbitrary substitutions of his own work for the clearer work of others, in spite of the fact that he emphasized system at the expense of the broader principles of comparison, and withal contributed to the fixing, for five generations, the dogma of constancy of specific characters,— botanists will always regard Linnæus as one of the truly great. He was the “father of botany,” not even its elder brother. He was not the author of binomial nomenclature, for that originated before Linnæus was born; he was the first who was able to look at the existing knowledge of plant life with some degree of perspective, and he reduced that knowledge to a system, that botany might later become a science.

LUCIEN M. UNDERWOOD, *Committee.*



## New York Entomological Society.

IN MEMORY OF CAROLUS LINNÆUS, 1707-1778.

The name of Linnæus, the illustrious naturalist who first pointed out the real utility of some system by which the great kingdoms of nature could be systematically arranged, is known to the whole civilized world.

Linnæus was not only a naturalist of most accurate observation, but of a philosophical mind, and upon this depended in a great degree the unparalleled influence which he exercised upon the progress of every branch of natural history.

If we consider the difficulties which beset his early scientific career, the limited number of collections of animals and plants at his command, we must admit that the merit which his contemporaries awarded him was very justly earned.

Among the important services which he rendered to science was the creation of a natural system of classification and the introduction of a more precise nomenclature, which in the main is followed to-day.

While quite young he received his first inspiration for natural history in his father's garden, which was planted with many rare shrubs and flowers. Those sparks which were kindled in the early part of his life at last burst into such a flame of intensity, that the marks are indelibly left upon the sciences.

Entomology owes much to the work of this great man.

In his "*Systema Naturæ*" (tenth edition), he divided the insects into seven orders, as follows: Coleoptera, Hemiptera, Lepidoptera, Neuroptera, Hymenoptera, Diptera and Aptera.

The modern orders Forficulidae and Orthoptera were placed with the Coleoptera; the order Thysanoptera, with the Hemiptera. The order Neuroptera included the modern orders Ephemera, Plecoptera, Isoptera, Corrodentia, Platyptera, Neuroptera, Mecoptera, Trichoptera and Odonata. The order Aptera contained all the insects without wings or elytra, except the females of Mutillidæ, including also those arthropods which form to-day the classes of Arachnida and Myriapoda. Each order contained a small number of genera which were not arranged into families.

Of the many insects described by him, about three hundred species occur in the United States, most of which were originally described from Europe, and some from South America. Of the different orders represented, Linnæus described seven species of Neuroptera, four species of Odonata, twelve species of Orthoptera, twenty-seven species of Hemiptera,

a hundred species of Coleoptera, fifty species of Diptera, twenty-eight species of Hymenoptera and sixty-six species of Lepidoptera.

The New York Entomological Society appreciates this opportunity of paying tribute to the memory of the man through whose wonderful far-sight and scientific attainment we are better able to understand the great system of nature.

C. W. LENG, *President*.

H. G. BARBER, *Secretary*.

# INSECTS DESCRIBED BY LINNÆUS WHICH ARE KNOWN TO OCCUR IN NORTH AMERICA.<sup>1</sup>

## Hymenoptera.

Rhodites rosæ	Sphex pennsylvanica
Rhyssa persuasoria	Oxybelus uniglumis
Chalcis minuta	Monobia quadridens
Pteromalus puparum	Polistes canadensis
Formica fusca	“ carolinus
“ rufa	“ annularis
Lasius niger	Vespa crabro
Odontomachus hæmatodes	“ maculata
Tetramorium cæspitum	“ rufa
Monomorium pharaonis	“ vulgaris
Sphærophthalma occidentalis	Cœlinxyz quadridentata
Pompilus tropicus	Bombus carolinus
Chalybion cæruleum	“ hortorum
Sphex ichneumonea	Apis mellifera

## Lepidoptera.

Danaïs plexippus	Cosmosoma auge
Heliconius charitonius	Utetheisa ornatrix
Agraulis vanillæ	Phragmatobia fuliginosa
Vanessa antiopa	Euplexia lucipara
Pyrameis atalanta	Dyptergia scabriuscula
Victorina steneles	Pyriphila pyramidoides
Anartia jatrophæ	“ tragopoginis
Ageronia feronia	Perodroma oculata
Diadema misippus	Scoliopterix libatrix
Calephelis cænius	Plusia culta
Leptalis melite	Ophiderus materna
Catapsilia eubule	Erebus odora
“ philea	Euproctis chrysorrhæa

<sup>1</sup> Contributed by the New York Entomological Society.

<i>Papilio ajax</i>	<i>Bombyx mori</i>
" <i>philenor</i>	<i>Hydria undulata</i>
" <i>polydamus</i>	<i>Eustroma papulata</i>
" <i>mackaon</i>	<i>Rheumaptera hastata</i>
" <i>troilus</i>	" <i>tristata</i>
" <i>turnus</i>	<i>Philobia notata</i>
" <i>glaucus</i>	<i>Eramis defoliaria</i>
<i>Pamphila comma</i>	<i>Anagoga pulveraria</i>
<i>Ælopus tantalus</i>	<i>Zeuzera pyrina</i>
" <i>ixion</i>	<i>Sesia culiciformis</i>
<i>Triptogon lugubris</i>	" <i>tipuliformis</i>
<i>Chœrocampa tersa</i>	<i>Diaphamia hyalinata</i>
<i>Argeus labruscæ</i>	<i>Pyrausta octomaculata</i>
<i>Pachylia ficus</i>	<i>Pyralis farinalis</i>
<i>Pholus vitis</i>	<i>Crambus puscuellus</i>
<i>Pseudosphinx tetrio</i>	<i>Calleria mellonella</i>
<i>Dilophonota ello</i>	<i>Ophomia sociella</i>
<i>Phlegothontius carolina</i>	<i>Orneodes hexadactyla</i>
<i>Sphinx pinastri</i>	<i>Olethreutes hartmanniana</i>
<i>Samia cecropia</i>	<i>Carpopapsa pomonella</i>

### Coleoptera.

<i>Cicindela carolina</i>	<i>Ptinus fur</i>
" <i>virginia</i>	<i>Ernobius mollis</i>
<i>Elaphrus riparius</i>	<i>Sitodrepa panicea</i>
<i>Blethisa multipunctata</i>	<i>Phanæus carnifex</i>
<i>Loricera cærulescens</i>	<i>Aphodius fossor</i>
<i>Bembidium ustulatum</i>	" <i>erraticus</i>
" <i>4-maculatum</i>	" <i>fimetiarius</i>
<i>Casnonia pennsylvanica</i>	" <i>granarius</i>
<i>Eretes sticticus</i>	<i>Trox scaber</i>
<i>Dytiscus marginalis</i>	<i>Polyphylla occidentalis</i>
<i>Hydrobius fuscipes</i>	<i>Pelidnota punctata</i>
<i>Sphæridium scarabæoides</i>	<i>Dynastes tityus</i>
<i>Cercyon melanocephalum</i>	<i>Cotinis nitida</i>
" <i>unipunctatum</i>	<i>Euphoria inda</i>
<i>Silpha americana</i>	<i>Mallodon melanopus</i>
" <i>opaca</i>	<i>Prionus imbricornis</i>
<i>Staphylinus erythropterus</i>	<i>Hylotrupes bajulus</i>
<i>Tachyporus chrysomelinus</i>	<i>Achryson surinamum</i>
<i>Conosoma littoreum</i>	<i>Tragidion coquus</i>
<i>Hippodamia 13-punctata</i>	<i>Leptura sexmaculata</i>
<i>Coccinella trifasciata</i>	<i>Lagochirus araneiformis</i>
" <i>sanguinea</i>	<i>Crioceris asparagi</i>
<i>Adalia bipunctata</i>	" <i>12-punctatus</i>
<i>Harmonia 14-guttata</i>	<i>Adoxus obscurus</i>
<i>Chilocorus cacti</i>	" <i>vitis</i>

*Hyperaspidius trimaculatus*  
*Silvanus surinamensis*  
*Typhoea fumata*  
*Dermestes lardarius*  
*Attagenus pello*  
*Anthrenus scrophulariæ*  
     "    *musæorum*  
*Hister bimaculatus*  
*Carpophilus hemipterus*  
*Epuræa æstiva*  
*Nitidula bipustulata*  
     "    *rufipes*  
*Omosita colon*  
*Latridius minutus*  
*Tenebriodes mauritanica*  
*Peltis ferruginea*  
*Cyphon padi*  
*Alaus oculatus*  
*Corymbites tessellatus*  
     "    *cruciatus*  
*Ellychnia corrusca*  
*Photinus pyralis*  
*Buprestis aurulenta*  
*Lamphrohiza splendida*  
*Neerobiaviolacea*

*Prasocuris Phellandrii*  
*Chrysomela philadelphica*  
*Gastroidea polygoni*  
*Lina lapponica*  
*Gonioctena pallida*  
*Phyllodecta vulgatissima*  
*Trirhabda tomentossa*  
*Crepidodera rufipes*  
     "    *Helxines*  
     "    *Modeeri*  
*Bruchus pisorum*  
     "    *chinensis*  
*Blaps mortisaga*  
*Unis ceramboides*  
*Tenebrio molitor*  
*Nacerdes melanura*  
*Brachyderus incanus*  
*Otiorhynchus ovatus*  
*Elleschus bipunctatus*  
*Cionus scrophulariæ*  
*Cryptorhynchus lapathi*  
*Rhinoncus pericarpus*  
*Brenthus anchorago*  
*Rhynchophorus palmarum*  
*Calandra oryzae*

### Hemiptera.

*Pachycoris fabricii*  
*Euthyrhynchus floridanus*  
*Mormidea ypsilon*  
*Euschistus ictericus*  
*Nezara vividula*  
*Edessa arabs*  
*Leptoglossus phyllopus*  
     "    *balteatus*  
*Ligyrocoris sylvestris*  
*Emblethis arenarius*  
*Largus succinctus*  
*Dysdercus andreae*  
*Leptopterna dolabrata*  
*Lygus pratensis*

*Capsus ater*  
*Monalocoris filicis*  
*Halticus apterus*  
*Acanthia lectularia*  
*Coriscus ferus*  
*Arilus cristatus*  
*Heza acantharis*  
*Zelus longipes*  
*Reduvius personatus*  
*Salda littoralis*  
     "    *saltatoria*  
*Corixa striata*  
*Lygus pabulinus*

### Diptera.

*Trichocera regelationis*  
*Xiphura atrata*  
*Chironomus pedellus*  
     "    *plumosus*

*Eristalis tenax*  
*Syritta pipiens*  
*Gastrophilus hæmorrhoidalis*  
     "    *nasalis*



*Orthocladus barbicornis*  
*Cricotopus tremulus*  
*Tanypus monilis*  
*Culex pipiens*  
*Scatapse notata*  
*Simulius reptans*  
*Hermetia illucens*  
*Sargus cuprarius*  
*Microchrysa polita*  
*Tabanus mexicanus*  
*Anthrax moris*  
*Bombylius major*  
*Scenoppinus fenestralis*  
*Laphira gilva*  
*Erax æstuans*  
*Leucozona lucorum*  
*Lasiophthicus pyrastris*  
*Syrphus ribesii*  
*Sphærophoria scripta*  
*Sericomyia lappona*  
*Doliosyrphus nemorum*

*Cestrus oris*  
*Edemagena tarandri*  
*Melanophora roralis*  
*Cynomyia mortuorum*  
*Calliphora vomitaria*  
*Lucilia xæsor*  
*Pyrellia cadaverina*  
*Musca domestica*  
*Stomoxys calcitrans*  
*Hamalomyia canicularis*  
*Anthomyia pluvialis*  
     "    radicum  
*Scatophaga stercoraria*  
*Tetanocera umbrarum*  
*Scaptera nibrans*  
*Themira patris*  
*Piophila casei*  
*Scyphella flava*  
*Hippobosca equina*  
*Ornithomyia avicularia*  
*Melaphagus ovinus*

### Orthoptera.

*Forficula auricularia*  
*Labia minor*  
*Blatta germanica*  
*Stylopyga orientalis*  
*Periplaneta americana*  
*Pycnoscelus surinamensis*

*Stagmomatis carolina*  
*Achurum brevicornis*  
*Dissosteira carolina*  
*Cyrtophyllus perspicillatus*  
*Conocephalus triops*  
*Gryllus domesticus*

### Odonata.

*Trithemis umbrata*  
*Tamea carolina*

*Libellula quadrimaculata*  
*Æschna juncea*

### Corredontia.

*Clothilla pulsatoria*  
*Cæcilius pedicularis*

*Psocus sexpunctatus*

### Platyptera.

*Chauliodes pectinicornis*

*Corydalis cornutus*

### Trichoptera.

*Limnophilus rhombicus*  
     "    griseus

*Leptocerus niger*

**The Staten Island Association of Arts and Sciences.**

It has been said by Taine that "every book and every man may be reviewed in five pages, and those five pages in five lines." On this occasion, however, we are not asked to review the life or the books of the man in whose honor we are assembled, but to testify as briefly as may be to our appreciation of his work and what this work has meant to his posterity. Such a task is different from that which the reviewer is ordinarily called upon to perform; and to do it justice in words, within a reviewer's recognized limitations, would be impossible in connection with the name of Linnæus. Fortunately, however, words are not necessary, and indeed are superfluous, where this appreciation is so clearly demonstrated in the fact that we accept the principles which he formulated, and pursue the methods which were his, in all of our scientific activities. By merely recognizing and calling attention to this fact, we show our respect for the man and what he has wrought far better than by even the most earnest and sincere attempt to express our sentiments in words.

Consciously or unconsciously the influence of Linnæus is felt by all modern scientific workers. System, or rather the ability to systematize, is the key to progress in all lines of human endeavor; and science in particular owes its present commanding position to those who have recognized and applied the principles of Linnæus in their work, and who have accepted and applied his rules for the nomenclature of natural objects.

Linnæus was pre-eminently a systematist, and it was this habit of mind, more than anything else, which raised him above his contemporaries in science. Without his masterly ability to co-ordinate and arrange his work in logical sequence and coherent groupings, his great powers of observation would have lacked completeness. This ability was the special characteristic which enabled him to revolutionize the scientific work of his age and to influence so profoundly all that has followed.

To Linnæus may well be applied the words of Bourget: "In life everything is unique, and nothing happens more than once."

ARTHUR HOLLICK, *Delegate.*

**New York State Museum.**

Linné's contributions to systematic biology are brilliantly exemplified by one of his species of fossil brachiopods, the *Anomites reticularis*. No organism which ever appeared in the long history of the earth has had a

career so noteworthy for the stability of its specific characters. It made its début in the Midsilurian era, and thence onward it survived through the long ages of the Devonian and into the Carboniferous, without at any time departing from the specific type.

*Anomites reticularis* stands as the ideal of conservatism, the very shibboleth of heredity, Nature's ultimate expression of stability in the organic world. Its life was the longest that ever fell to the lot of organic species; its period beheld the rise and fall of many another race; an endless procession of creations saluted it and passed on, as we to-day, after two hundred years, salute the great Swede, and pass on to join the multitude.

JOHN M. CLARKE, *Director*.

### **The Buffalo Society of Natural Sciences.**

The Buffalo Society of Natural Sciences, in expressing its thanks to your honorable Society, and its appreciation of its privilege in being permitted by your courteous invitation to share in your celebration of the two hundredth anniversary of the birth of Carl von Linné, desires to add its tribute of praise to the memory of that great reformer in the work of natural science.

The world must ever be grateful to Linnæus for the wonderful knowledge, born of close and accurate observation, and for the clear vision and admirable judgment which enabled him to index the book of Nature, to substitute order for confusion, and, by the judicious simplicity of the laws laid down by him in his methods of classification, to convert, what before his time had been chaotic, into the orderly ways that characterize the modern systematic study of botany and biology.

To him and to his work we turn as the starting-point for these scientific studies which since his day have been so nobly developed by those who have been his successors.

Though his system may have been superseded by the philosophical conclusion of other famous workers in botanical science during the past two centuries, the revolution which he wrought in that great department of nature study, the lucidity and simplicity of the reforms in method which he first proposed, have crowned him as one of the greatest leaders known to the annals of science, and as such we honor and revere his memory.

We ask you to accept our felicitations on this interesting occasion.

T. GUILFORD SMITH, *President*.

CARLOS E. CUMMINGS, *Secretary*.

**The American Philosophical Society.**

The American Philosophical Society held at Philadelphia for Promoting Useful Knowledge sends cordial greetings to the New York Academy of Sciences on the occasion of the celebration of the two hundredth anniversary of the birth of Carolus Linnæus.

Out of the mechanical and inorganic systems of ancient and mediæval times this great Swedish naturalist constructed an organized system, which, assisted by the binomial nomenclature, established order and system in the natural sciences. This system has guided clearly the mind of man in the classification of natural objects, and has made the name of its author immortal.

In the year 1770 The American Philosophical Society, in recognition of the valuable services Carolus Linnæus rendered to science, elected him to its membership, and now, a hundred and thirty-seven years later, this Society takes pleasure in uniting with the New York Academy of Sciences in doing honor to his memory.

Signed and sealed on behalf of The American Philosophical Society held at Philadelphia for Promoting Useful Knowledge.

EDGAR F. SMITH, *President.*

J. MINIS HAYS, *Secretary.*

**The National Academy of Sciences, Washington, D.C.**

I am directed by President IRA REMSEN of the National Academy of Sciences to convey the greetings and congratulations of the National Academy on this occasion of the celebration of the two hundredth anniversary of the birth of Linnæus. I desire to present a brief appreciation of Linnæus from the standpoint of comparative anatomy and classification of the mammalia.

The period of Linnæus was that of his active scientific life, between 1730 and 1795. Linnæus did not introduce the term "Mammalia" until the tenth edition of the "Systema" (1758). In following the suggestions of Ray, Bernard de Jussieu, and, it is also claimed, of Blumenbach, he separated the hairy quadrupeds, the manatees and whales, as a single class, noting among the distinctive characters the position of the mammae and the hairy covering. His education as a physician qualified him to define the class through the internal anatomical characters,—the heart, the lungs, the sense organs,—as well as through external characters. In arranging



the mammals he sought for natural groupings, and endeavored to find the hidden bonds of structural affinity as indicated by comparative anatomy, although he did not recognize that the real basis of affinity is to be found in kinship of evolution from similar ancestral forms.

His scientific independence and genius were indicated especially by his inclusion of man with the apes and monkeys in the order Primates. It was a mark of genius that Linnæus felt the force of the anatomical likeness of man to his lower relatives and that he had the courage to definitely ally him with them from a strictly zoölogical view-point. This is the very starting-point of all modern philosophy, that man is linked by ties of blood kinship to the whole organic world.

That Linnæus's system is based in part on adaptive resemblances or analogies, rather than on structural affinities or homologies, is not surprising, because it is only recently that naturalists have been able to distinguish analogies from homologies.

HENRY FAIRFIELD OSBORN, *Delegate*.

#### **The Smithsonian Institution of Washington, D.C.**

The Smithsonian Institution, uniting with the New York Academy of Sciences in its appreciation of Carl von Linné, cordially accepts its invitation to participate in exercises commemorative of the two hundredth anniversary of the birth of the great Swedish naturalist.

The Smithsonian Institution, in response to the invitation to take part in the Academy's celebration of the bicentenary by an appreciative record of the work of von Linné, needs only to recall the great impulse which he gave to natural science by his industry and methods, and the facility for expression of facts by his binomial system of nomenclature. But the philosophic generalization which was recorded in the name of Mammalia may be especially recalled as the greatest morphological triumph of the Linnæan era.

CHAS. D. WALCOTT, *Secretary*.

#### **The Biological Society of Washington, Washington, D.C.**

The Biological Society of Washington acknowledges with pleasure the invitation of the New York Academy of Sciences to take part in its celebration of the two hundredth anniversary of the birth of Carl von Linné, and is glad to unite in paying fitting tribute to the memory of the man who is justly regarded as the father of the biological sciences.

It is, in fact, scarcely possible to overestimate the influence his work and personality had in shaping the future of botany and zoölogy; and coming generations of biologists will continue to rejoice, as we now do, that he laid the foundations of their science so deep and so broad.

The vocabulary of superlatives to praise his genius has long since been exhausted; but we who daily and hourly profit by the laws he enunciated may well pause in our work to exult because, two hundred years ago, Sweden gave to the world a light that will continue to shed luster upon her name so long as the biological sciences exist.

LEONHARD STEJNEGER, *President.*

WILFRED H. OSGOOD, *Secretary.*

### **The Indiana Academy of Sciences, Indianapolis, Ind.**

The criterion by which a man's greatness is judged is his work. If this gains recognition from his contemporaries, he is successful; if his name lives to be honored by succeeding generations, his career has been more than successful, he has achieved fame; but, if he leaves behind him some piece of work or the record of some discovery from which his successors reckon time, his is a distinction which comes to few men, and to which none dare aspire. Such is the record of Linnæus. He was a recognized leader among his contemporaries; his co-ordination of the chaos which then existed in the natural sciences gave him fame; and the successful application of the binomial system of nomenclature to animals and plants made his works the point from which the taxonomist measures time. Nor is the homage the expression of the whim of a group of hero-worshippers. To-day the system of Linnæus is discarded by taxonomists, and much of his work is forgotten; but as long as systematic botany and zoölogy have their devotees among men of science, so long will his name be remembered and his fame endure as the one who first brought the binomial system of nomenclature into general use.

GUY WEST WILSON, *for the Academy.*

### **The Colorado Scientific Society, Denver, Colo.**

The Colorado Scientific Society, the oldest and largest scientific association of the Rocky Mountain region, sends greeting to its elder sister in the metropolis of America, and extends congratulations on the successful completion of the memorial in honor of the world's greatest botanist. How great must be the power of the savant whose influence can extend over

such great gulfs of space and time as those which separate the sage of Upsala from the naturalists of the Rocky Mountains, the lands of the midnight sun from the dome of the North American Continent, the dawn of the eighteenth from that of the twentieth century!

In common with the rest of the scientific world, we are greatly indebted to him who initiated the modern system of a concise and descriptive nomenclature, to him who found "biology a chaos, and left it a cosmos," and to him who made it possible for finite minds to grasp the thoughts of the Infinite in the world of life.

Colorado is especially indebted to Linnæus from the fact that, owing to the general similarity of our Alpine flora to the plants of the Scandinavian Alps, a large portion of our mountain plants was originally described by the father of botany, and so well classified and described, that the notoriety-seeking, hair-splitting species-makers do not venture to meddle with the work of the master hand.

We are proud of the fact that on the snowy summits of our higher peaks grows in abundance the tiny pink-tipped flower which the innate modesty of the true savant led him to select from all the wealth of the floral world to perpetuate his name in coming generations.

G. L. CANNON, *President*.





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